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ABSTRACT

Within the public elementary/secondary school systems of the United States there is tremendous diversity in educational funding provided by the federal government, states, and localities. An issue of intense interest to education policymakers is what influences the level and composition of state and local spending. This publication contains papers, presented at the annual National Center for Education Statistics (NCES) State Data Conference, that explored reasons why funding disparity among states persists. The papers share the theme that funding differences arise from differences in geographic location, economic ability, and relative position. These disparities will probably not be resolved quickly. The authors also share a pessimistic assessment of the future, predicting increasing student enrollments which will create more fiscal stress upon states and school systems with poor demographic and fiscal conditions Following the foreword and acknowledgments, the contents include: (1) "Introduction and Overview" (William J. Fowler, Jr.); (2) "Public School Teacher Cost Differences Across the United States: Introduction to a Teacher Cost Index (TCI)" (Jay G. Chambers); (3) "Meeting the Challenge of Devolution: How Changing Demographic and Fiscal Contexts Affect State Investments in Education" (Martin E. Orland and Carol E. Cohen); (4) "The Growth of Education Revenues Between 1982-83 to 1991-92: What Accounts for Differences Among States?" (Nicola A. Alexander); (5) "A Study of Administrative Expenditures in Texas Public Schools" (Chrys Dougherty); (6) "Administrative Expenditure Limits for Texas Public School Districts" (Scott Jay Lewis); (7) "Summary of 'Where's the Money Gone': Changes in the Level and Composition of Education Spending (1967-1991)" (Richard Rothstein); and (8) "Improving School Performance While Controlling Costs" (Eric Hanushek). Most chapters contain references. (LMI)

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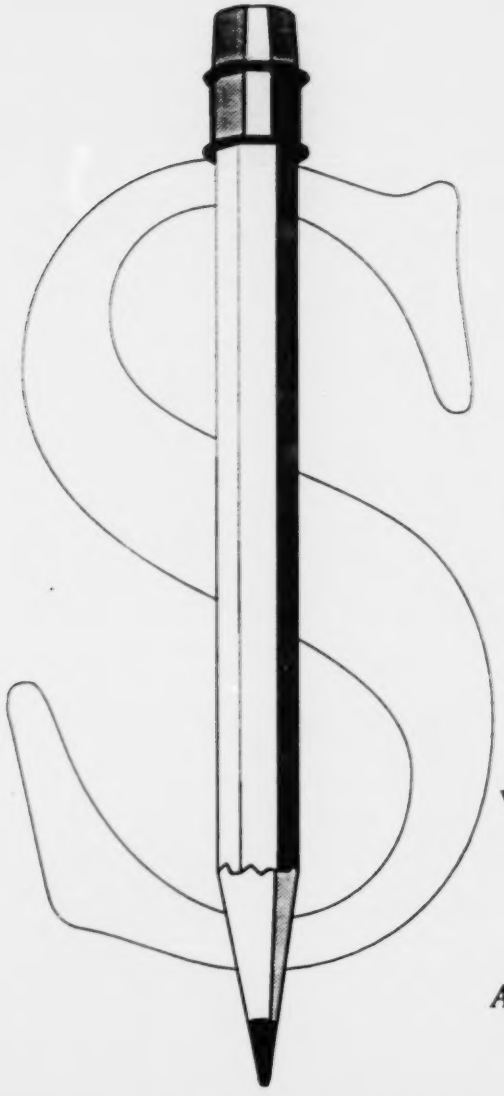

William J. Fowler, Jr., Editor

Fiscal Proceedings from the Annual NCES State Data Conference July 1995

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Foreword

Paul D. Planchon, Associate Commissioner
Elementary and Secondary Education Division

Of all the areas within public elementary and secondary education that are experiencing rapid change, none is experiencing more turmoil than school finance. In part, this is the result of the action of state courts and state legislatures. Innovative proposals and new funding mechanisms are changing the traditional landscape of school district financing. This activity in states has created a renewed interest in school funding at the federal level.

Developments in School Finance contains papers by presenters at the annual National Center for Education Statistics (NCES) State Data Conference. The Conference attracts several state education department policymakers, analysts, and data providers from each state, who are offered training sessions and updates on developments in the field. The presenters are experts in their respective fields, each of whom has a unique perspective or interesting quantitative research to bear on emerging issues in school finance. The reaction of the participants to these presentations was overwhelmingly positive. We hope that will be your reaction as well.

This report is the second publication of the proceedings of the State Data Conference. The papers are intended to promote the exchange of ideas among researchers and policymakers. Because the views are those of the authors, the papers may provoke discussions, replications, replies, and refutations. If so, the publication will have accomplished its task. There would be nothing so satisfying to the Center as promoting and contributing to the field of school finance.

Acknowledgments

The editor wishes to gratefully acknowledge the comments and suggestions of the reviewers: Lee M. Hoffman and Michael P. Cohen of the National Center for Education Statistics (NCES). I also wish to acknowledge the contributions of Carol Rohr, Mia Perona, and Rebecca Pratt of Pinkerton Computer Consultants, who edited the manuscript and incorporated the text and graphics into a published document.

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William J. Fowler, Jr.
National Center for Education Statistics

About the Author

Dr. William J. Fowler, Jr. is an education statistician at the U.S. Department of Education, National Center for Education Statistics (NCES), who specializes in school finance and educational productivity research. His work has focused on redesigning the federal school finance data collection effort to obtain information that can provide more policy-oriented analyses for the school finance community. NCES recently reinstituted a state and school district finance data collection effort for the first time in more than a decade, and is currently funding exploratory research work.

Prior to his work at NCES, Dr. Fowler served as a supervisor of school finance research for the New Jersey Department of Education, and taught at Bucknell University and at the University of Illinois. He also served as a senior research associate for the Central Educational Midwestern Regional Educational Laboratory (CEMREL) in Chicago and for the New York Department of Education.

Dr. Fowler has been a member of the American Education Finance Association since 1977, and was elected to its Board of Directors in 1992. He is a coauthor of *Disparities in Public School Spending, 1989–90*, and a coeditor of *Organizational Influences on Educational Productivity*, published by the JAI Press. In addition, he serves on the editorial board of the *Journal of Education Finance*. Dr. Fowler obtained his doctorate in education from Columbia University in 1977.

Introduction and Overview

William J. Fowler, Jr.
National Center for Education Statistics

Within the public elementary/secondary education school systems of the United States there is tremendous diversity in educational funding provided by the federal government, states, and localities. In part, this funding diversity is due to differences in the cost-of-living in different geographic areas, and, in part, to the demographic and fiscal composition of the school district. An issue of intense interest to education policymakers is what influences the level and composition of state and local spending. A frequently asked question by the public is, "Where has the money gone?" The public effort to fund education rose over the last four decades (*Condition of Education* 1995, p.148), as did public education revenues. This combination of increasing outlays and increasing effort has caused an interest in the efficiency of the public education system. Some individuals allege that in the last quarter-century, education expenditures have doubled, but student achievement has remained stagnant (Hanushek and Rivkin 1994).

The presenters at the National Center for Education Statistics (NCES) summer conferences addressed a general interest in why funding disparity persists. In the first paper, **Jay Chambers** examines why teacher salaries differ among geographic locations across the country. In his exploratory work to develop a cost-of-education index (CEI), Chambers asks:

> How much more or less does it cost in different jurisdictions to recruit and employ school personnel with similar characteristics into similar jobs and job assignments?

To answer this question, Chambers utilized the NCES 1990–91 Schools and Staffing Survey (SASS) of over 40,000 public school teachers. This analysis aided Chambers in obtaining the necessary statistical data on teacher salaries and cost. Because of the variations in teacher costs, Chambers used the *hedonic wage model*—a model that provides a conceptual framework for understanding the various factors that underlie variations in the patterns of teacher salaries in an attempt to capture the intricacies involved in a teacher's decision to be employed by a school district and the school district's decision to

employ the teacher. In this regard, the school district's preferences for a certain type of individual and the prospective teacher's perception of the geographic amenities of the school district heavily influence the decision of each party.

Chambers finds that school districts with highly competitive labor markets have teacher salaries that are as much as 8 percent higher than those in districts where there is high unemployment or a lack of competition. Teacher salaries are approximately 4 percent higher in school districts experiencing high land prices or a rapidly growing population and are approximately 6.5 percent higher in more densely populated areas and larger urban areas that have higher crime rates. Chambers also finds that teachers are willing to forego higher salaries to work in areas that have warmer climates and/or less snowfall.

Chambers uses a value of 100 as the overall mean value of the teacher cost index (TCI) for the United States. The variation in the TCI ranges from a low of 53 to a high of 137, depending on the district's costs. Using an inappropriate index can yield significantly different conclusions about the levels of educational services being provided in different regions of the country.

The second paper presented at the NCES summer conference asks how the impending devolution of federal education funding might affect state and local funding in education. To understand how a reduction in federal aid might change state and local spending, **Martin E. Orland** and **Carol E. Cohen** explore three broad factors that influence state spending for education: the service needs of states; the ability to pay; and the willingness to pay. The authors assume that, all else being equal, states with higher population to pupil ratios, a higher fiscal capacity, and those that exhibit greater "fiscal effort" will have a higher level of per-pupil spending. Examination of the empirical results demonstrates that this assumption is correct. However, among high spending states, there is no common factor that explains the high spending. In Connecticut, an abundant tax capacity explains high spending, while Vermont's high spending is attributable to high educational effort rates. In contrast, Massachusetts has a high population/pupil ratio which allows this state to spend generously with effort levels that are only 85 percent of the national average.

In low spending states with low spending, virtually every state has both a low per-capita income and a low demographic capacity. Although these low spending states have at least average levels of educational effort, a combination of a weak fiscal resource base and the need to support large numbers of children results in low per-child service levels.

For the future Orland and Cohen suggest that there are two implications for education spending over the next decade. First, growth rates in per-pupil education spending will not increase at the same rate as in the 1970s and 1980s. Also, growth rates in per-capita income will be slower than what the nation has experienced in previous decades. Second, it is unlikely that disparities among states in their spending levels will be reduced in the future. For instance, of the 10 highest-spending states, only 3 states will have higher-than-average enrollment growth through the year 2005.

In the third paper presented, **Nicola A. Alexander** approaches the question of why state revenues have grown differentially between school years 1982–83 and 1991–92. She examines four factors related to changes in education revenues: effects of large enrollment increases on the growth of per-pupil revenue; results of per-pupil revenues in school year 1982–83; effects of economic growth on increases in per-pupil school revenues; and the contribution of revenues from different government levels to changes in school revenues.

Alexander discovers a relationship between the rapid growth of a state's economy and an above average rise in per-pupil revenues. In addition, states with lower education revenues experienced rapid revenue increases. This process is termed "conver-

gence," that is, high spending states might be expected to experience fiscal pressure to slow down their rate of growth, while low-spending states might desire to "catch-up." To her surprise, Alexander also finds that increases in enrollment have positive, rather than the expected negative, outcome on the augmentation of state education revenues. In addition, states with the fastest growth of real per-pupil education revenues rely on increases in local sources of revenue rather than on state revenue increases, although this was not dependent upon the percent of state support. The statistical analysis performed also suggests a pattern of regional variation in per-pupil growth, in which the Plains, Southwestern, and Rocky Mountain states had the lowest growth of education revenue from school year 1982–83 to school year 1991–92.

Regardless of the rapid growth of real state education funding, the absolute level of state education funding, or the percent of state share compared to local and federal sources for education funding, states' exhibit a fiduciary interest in funds being well spent. The first of the presentations that examines the efficacy of public school district spending, by **Chrys Dougherty**, focuses on a procedure for identifying Texas school districts that spent too much on administration. In 1991, Texas had 1,053 school districts, of which 393 enrolled less than 500 students, and the smallest school district enrolled only two students. Because even the smallest school districts may employ a superintendent, and perhaps also a principal, administrative expenditures can be a substantial expenditure. Three definitions of administrative spending are used by Dougherty: administrative spending per student; the ratio of administrative spending to instructional spending; and the ratio of administrative to total operating expenditure. Dougherty finds that economies of scale vanish for a district size beyond 2,000 students. He also uses a broad definition of administrative expenditures to discourage "creative accounting" and "born-again curriculum coordinators."

Dougherty finds that the ratio of administrative to instructional expenditure is the most effective measurement of excessive administrative expenditure because the ratio does not need to be adjusted for inflation and encourages shifting of expenditures from administration to instruction. To determine excessive administrative expenditures, a least-squares regression was used to determine which variables were associated with administrative expenditures. The initial equation used school district size, wealth, average campus (school) size, pupil-teacher ratio, percent of limited-English proficient students, percent of students in special education, and percent of students in compensatory education, as well as student mobility and the index of administrative salaries to those in other school districts.

Apparently, school districts treat administration as a luxury—that is, the wealthier the school district, the higher the administration-instruction ratio. A lower pupil-teacher ratio also leads to more administrative spending. Districts with limited-English proficient or compensatory students also have higher administrative expenditures. Dougherty also explores whether there is a relationship between administrative expenditures and student learning, and student learning on the Texas Assessment of Academic Skills (TAAS) test. Finally, Dougherty conducted case studies of selected school districts with unusually high or low ratios of administrative to instructional expenditure.

Scott Jay Lewis builds on the work by Dougherty by discussing the legislation enacted by the Texas Legislature in 1993 to require Texas school districts to limit their administrative expenditures to a percentage of their instructional expenditures. Senate Bill 7 (SB7) requires the establishment of administrative expenditure standards for school districts, the monitoring of these administrative expenditure standards by the Texas Education Agency (TEA), and the recovery of funds from districts that do not meet these standards. The result has been a decrease in the statewide average instructional to administrative expenditure ratio in each year since 1988, with the most dramatic change between 1992 and 1993.

Richard Rothstein examines where increases in education funding have gone. In his presentation, Rothstein examines the expenditures of nine school districts over 25 years, from 1967 to 1991, and concludes that, while spending has risen substantially, the increase is smaller than the traditional claims that inflation-adjusted (real) spending "roughly doubled" over that time period. In addition, only about a quarter of the increase in education spending went to "regular education." He believes that this is consistent with the student level of achievement attained during that period.

Rothstein finds that the school districts he examined have not achieved productivity gains comparable to those in manufacturing over the quarter-century. For example, pupil-teacher ratios would have had to increase, rather than decline, over the time period, for school districts to have become more productive. However, Rothstein cites the work of another economist William Baumol to assert that service sector institutions can seldom achieve such gains. Interesting examples are barbers and orchestras, in which we may not expect an increase in haircuts/barbers, or a decline in musicians/symphonies.

Putting aside these interesting insights, when Rothstein turns to his main question of where the increase in education funds have gone, he finds that special education absorbed 38 percent of the new funds, this was more than regular education, which received only 26 percent of the new funds. About 8 percent of the new funds went to expansion of the school lunch and breakfast programs, and another 7 percent went to attendance, dropout prevention, alternative instruction and counseling. Within regular education, higher average teacher salaries were mainly due to teachers' increased experience and advanced degrees. However, urban districts barely increased their regular education spending.

The notion that the expenditure per-pupil has doubled in the last quarter-century while student performance has at best stayed constant, comes from the presentation of **Eric A. Hanushek**. He suggests that school resources have been very inefficiently deployed. This issue is a concern because school quality is an element in determining the productivity growth of the nation's economy; if school quality declines, future economic growth is in jeopardy.

Economists have not ignored education, which is, after all, a sector of the economy larger than steel and automobiles. Hanushek believes that the results obtained from economists have been ignored, and possibly contradicted, in some school reforms that have been undertaken. In addition, the pattern of spending changes in recent years points to an upcoming fiscal crisis for the nation's schools; for, unlike that occurring during the 1970s and 1980s, the student population is again increasing. Local taxpayers are likely to oppose continued expenditure increases, as increased enrollment and rapid increases in expenditures combine to put "schools in a difficult fiscal squeeze."

Hanushek also finds that smaller class sizes, implemented to improve educational quality, are dramatically more expensive, but in the range of operations of 15 to 40 students, do not improve student performance. He also suggests that a teacher obtaining an advanced degree does little to ensure high performance, but increases expenditures. In short, "schools do not regularly insure that increased student performance flows from increased expenditure." At the same time, Hanushek argues that some schools are considerably better than others, suggesting that if school reform were correctly carried out, the odds that a child is in a favorable learning environment would increase.

Hanushek then goes on to argue what might be done, but considers the cost of such changes, as well as the benefits. He recognizes that education is very complex, and that current knowledge supports simultaneously implementing a variety of differing approaches. However, all of these strategies should involve incentives, on-going evaluation, the display of performance achieved, and decision rules regarding

their success. Improving schools, Hanushek argues, "is currently made very difficult by the lack of generally agreed upon measures of performance." Oddly, this does not mean "test-driven management of schools," but more controversial programs, such as merit pay for teachers, private contracting, magnet schools, school choice, and charter schools. All of these are "virtually untested," which Hanushek argues calls for a broad program of experimentation, including "two-tier" employment contracts. He ends by arguing that "expanding resources first, and looking for reform second, is very unlikely to lead to an improved system."

The importance of these presentations is that funding differences in the public elementary-secondary education school systems of the United States arise from differences in geographic location, economic ability, and relative position. There appears to be little likelihood of these disparities quickly being resolved. Ample evidence is presented that some school districts dissipate their funds by purchasing "luxury" items, such as more administration, while others see their funds diverted from "regular education." Both practices raise questions of productivity and efficiency during the last quarter-century, a time of relatively ample resources for education, because of declining student enrollment.

The presentations are also uniform in their pessimistic assessment of the future. They foresee increasing student enrollments, which will create more fiscal stress upon those states and school systems with poor demographic and fiscal conditions. Whether this fiscal stress will result in taxpayer revolts, more attention to the wise use of resources, incentives to preserve existing resources, or a new desire to provide additional funds for education will not be known until the presentations and observations of future conference participants.

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American Institutes for Research

About the Author

During the late 1970s and early 1980s, Dr. Jay G. Chambers served as the Associate Director of the Institute for Research on Educational Finance and Governance (IFG) at Stanford University, a national R&D center funded by the National Institute of Education. He is a nationally recognized expert in the analysis of patterns of resource allocation and cost variations in educational organizations and in recent years has played a major role in cost analyses of special education programs. He also was the principal investigator for *A Study of Chapter 1 Resources in the Context of State and Local Resources for Education*, conducted for the U.S. Department of Education, Office of Policy and Planning.

Dr. Chambers has directed two major school finance reform studies in Illinois and Alaska; he has directed a large-scale cost analysis of early intervention services in California; and, he has completed a cost analysis of migrant summer school programs.

Dr. Chambers served as an expert witness in the Levittown school finance reform case in New York State. He has also directed a major comparative study funded by the National Institute of Education on differences in the patterns of resource allocation and decision-making in public and private schools.

Currently, Dr. Chambers is Co-Director of the Center for Special Education Finance (CSEF) at the American Institutes for Research (AIR).

Public School Teacher Cost Differences Across the United States: Introduction to a Teacher Cost Index (TCI)

Jay G. Chambers
American Institutes for Research

Introduction

Since the mid-1970s, a number of studies have focused on the development of methodologies and empirical estimation of a cost-of-education index (CEI).[1] A CEI is designed to adjust for differences in the purchasing power of the educational dollar in different locations. Because personnel expenditures account for about 80 percent of local school budgets, most of the previous studies of education cost differences have focused attention on the analysis of personnel costs.[2] Thus, the development of an adequate methodology for addressing the differences in the costs of personnel would aid in the development of a CEI. But how are teacher cost differences defined?

Most educators readily acknowledge that school districts in different geographic locations encounter different costs in acquiring and retaining teachers with similar qualifications. That is, teacher salaries reflect not only the cost-of-living and desirability of a given geographic location, but also a school district's preference for teacher qualifications (e.g., educational

[1] See Chambers (1981a, 1981b) for methodological discussions. See Chambers and Parrish (1984) and Chambers (1978, 1980) for a comprehensive empirical study of educational cost differences. For work of other authors on the CEI, see Augenblick and Adams (1979); Brazer (1974); Grubb and Hyman (1975); Kenney, Denslow, and Goffman (1975); and Wendling (1979).

[2] Since some portion of the remaining 20 percent of school district budgets is allocated to personal service contracts (e.g., psychological services, physical and occupational therapy, consultants, repair services, and legal services), expenditures allocated to personnel actually exceed 80 percent.

preparation or experience levels). The studies of personnel cost differences address the following question:

How much more or less does it cost in different jurisdictions to recruit and employ school personnel with similar characteristics into similar jobs and job assignments?

Accurately measuring geographic cost differences has been one of the pre-eminent measurement challenges in education. The challenge of this task lies in identifying and measuring the factors that define *similar characteristics* and *similar jobs*, as well as those factors that reflect differences in the *cost-of-living* and *desirability* across geographic locations.

Until recently, no national data have been available to support a comprehensive analysis of the variations in teacher salaries. With the advent of the Schools and Staffing Survey (SASS), which was first conducted during the 1987–88 school year by the National Center for Education Statistics (NCES), a data source emerged that supports the empirical analysis required to develop a national, geographical teacher cost index (TCI).

Accurately measuring geographic cost differences has been one of the pre-eminent measurement challenges in education.

The study described in this paper draws on a sample of over 40,000 public school teachers, derived from the SASS database for school year 1990–91, to conduct the statistical analysis of teacher salaries and cost. In conjunction with the SASS data, the analysis also uses data from the Census Bureau (e.g., population and population density), the Bureau of Labor Statistics (BLS) (e.g., unemployment rates), the Federal Bureau of Investigation (FBI) (e.g., crime rates), and the National Climatic Data Center (NCDC) (e.g., climatic conditions).

The Importance of Cost-of-Education Adjustments

The importance of developing a CEI is that it may be used in two significant ways. First, it may be used to adjust educational expenditure or teacher salary data for differences in the purchasing power of the educational dollar in different communities. For the most part, published information on educational expenditures and salaries of school personnel across states and other local jurisdictions is based on actual reported values.[3] However, because of the existing variations in the costs of comparable educational resources across these jurisdictions, it is difficult to make comparisons of the level of educational services being provided in different locations. In order to make such comparisons, it is necessary to adjust reported data on average educational expenditures and teacher salaries for differences in the purchasing power of the educational dollar across jurisdictions.

Second, in addition to their importance for reporting expenditure and salary data, such cost-of-education adjustments play a significant role in analyses of the demand for educational services and inputs across communities.[4] Studies of educational resource allocation have commonly had to use measures such as average teacher salaries or other proxy variables (e.g., opportunity wages in other occupations) to reflect relative costs of school resources. Unfortunately, variations in average teacher salaries reflect both variations in costs, as well as the qualifi-

[3] For example, see the NCES publication, *Public Elementary and Secondary State Aggregate Data, for School Year 1990–91 and Fiscal Year 1990* (NCES Report No. 92-033).

[4] Example of studies of the demand for educational expenditures and demand for educational resources (e.g., staff/pupil ratios) at the local level include Barro (1974), Chambers (1975 and 1979), Feldstein (1975), and Ladd (1975).

cations of the teaching staff. Analysis of demand for school inputs requires an index of the relative cost of *comparable inputs*. The importance of accurately controlling for costs in these analyses is that ultimately such studies are often focused on addressing the impact of changes in state or federal policies or funding formulas. Without the ability to control for the impact of input costs on choices of local school district officials, it is not possible to isolate the effects of state and federal policies on patterns of resource allocation in local schools.

Toward the Development of a Teacher Cost Index (TCI)

Barro (1992) developed a model that adjusts the variations in average teacher salaries for variations in the levels of education and experience. Other researchers (e.g., McMahon and Chang 1991) have suggested using a *cost-of-living* adjustment to account for variations in the purchasing power of the education dollar. Unfortunately, neither of these alternatives is adequate. To capture such variations in teacher costs requires a comprehensive analysis of the patterns of teacher compensation. It requires a model that portrays the complexities of the employment transaction between an individual teacher and the school district: that is, one that accounts for school district preferences for teacher qualifications and individual teacher preferences for working and living conditions in local communities.

The model used for the development of the TCI—referred to by economists as the *hedonic wage model*—provides a comprehensive conceptual framework for understanding and sorting the various factors that underlie variations in the patterns of teacher salaries. This model is well suited to isolate the impact of regional amenities and costs of living on teacher salaries while controlling for various teacher and job characteristics.

In an earlier paper, Chambers (1981a) described the hedonic wage model as follows:

> The intuitive notion underlying this theoretical structure is that individuals care both about the quality of their work environment as well as the monetary rewards associated with particular employment alternatives, and that they will seek to attain the greatest possible personal satisfaction by selecting a job with the appropriate combination of monetary and non-monetary rewards. Similarly, employers are not indifferent as to the characteristics of the individual to whom they offer particular jobs. The result of these simultaneous choices is the matching of individual employees with employers. It is the result of this matching process itself that reveals implicitly the differential rates of pay associated with the attributes of individual employees and the working conditions offered by employers. More formally, it is the supply of, and demand for, individuals with certain personal attributes to any particular kind of job assignment that determines the equilibrium wages of labor as well as the implicit market prices attached to the personal and job characteristics.
>
> The implicit relationship observed between wages and the personal and job characteristics of individuals is referred to as a *hedonic* wage index. The word hedonic literally refers to the physical and psychic pleasures that one can derive from engaging in certain activities. In the context of labor markets, the word hedonic refers to the satisfactions or utility derived by employees from the characteristics of the work place and the profits or the perceived productive value derived by employers from the characteristics of employees they assign to certain jobs. The hedonic wage index permits one to decompose the observed variation in the wages paid to labor into the dollar values attached to each unit of the personal and workplace characteristics (p. 51).

Ordinary least squares regression is used to estimate the parameters of the model. The estimated coefficients provide a foundation for determining the

wage premiums (positive or negative) associated with particular personal, job, or location characteristics.

This analysis reveals wage premiums for attributes of the workplace and the employee that are not commonly included in regular salary schedules. For this reason, the coefficients are said to provide estimates of the *implicit* prices of particular attributes. The patterns of implicit prices for worker attributes result from the process of matching the combination of teacher characteristics embodied in a given individual teacher to the job characteristics embodied in a given job assignment. The employment of teachers in particular schools represents a process of choice for the teachers (on the supply side) and for the school district decision-makers (on the demand side) that reveals the trade-offs among the teacher attributes and job characteristics. These trade-offs provide the basis for the set of implicit prices.

Objectives of the Analysis

The TCI analysis presented here accomplishes two primary objectives. First, the TCI component extends the analysis of teacher salaries to include specific variables that reflect the costs of living and the amenities of the jurisdictions in which public school systems are located. Second, the empirical analysis of teacher salaries is used to estimate a TCI for each school district in the United States.

The TCI is designed to reflect variations in teacher salaries associated with factors that are *outside the control* of local school decisionmakers. Thus, calculation of the TCI requires *controlling for* (i.e., holding statistically constant) the differences in teacher qualifications and job assignments, while simulating the effects of the factors that reflect differences in costs of living and attractiveness of local jurisdictions. The analysis of teacher costs presented in this paper controls for two major categories of teacher and job attributes:[5]

- **Personal background characteristics** such as gender, race/ethnicity, marital status, total and job-specific experience, age, breaks in service, educational preparation, and undergraduate major;

- **Job assignment characteristics** such as percent age of full-time, an index of class size, whether the teacher is a mentor, percentage of out-of-field teaching (for secondary teachers only), amount of non-school time spent on school-related activities, ability levels of students taught, type of school, and indices of student behavior and problems.

The TCI is designed to reflect variations in teacher salaries associated with factors that are outside the control of local school decisionmakers.

Cost Factors: Regional and District Characteristics That Are Outside Local Control

How do teacher salaries vary with factors outside local control? These *cost factors* encompass variations in the costs of living, competitiveness of the labor markets, levels of crime, quality of the weather, availability of alternative job opportunities, and other attributes of the regions and districts that affect their attractiveness as places to live and work. It is anticipated that less attractive jurisdictions will have to pay relatively higher salaries to attract comparable teachers.

[5] A more detailed presentation of the analysis of the relationship between teacher salaries and these teacher and job attributes is contained in Chambers and Fowler (1995).

Highlights of the variations in teacher salaries in relation to each of the *cost factors* are presented below.

- **Competition in the market for teachers.** Counties with highly competitive labor markets for teachers exhibit salaries as much as 8 percent higher. In addition, counties with tighter overall labor markets, as reflected in lower unemployment rates, also exhibit higher teacher salaries.

- **Factors underlying cost-of-living differences.** Factors associated with higher costs of living, such as higher land prices and faster growth in population, are also associated with higher teacher salaries. Districts one standard deviation above the mean land values pay approximately 4 percent teacher cost difference. A one standard deviation difference in the growth rate of the local county is associated with a 1.6 percent teacher cost difference.

- **Amenities of urban and rural life.** In general, more densely populated areas and larger urban areas exhibit significantly higher teacher salaries. One standard deviation above the mean in metropolitan area population is associated with a 6.5 percent salary differential. The analysis reveals higher teacher salaries in areas with higher crime rates. A one standard deviation difference in violent crimes is associated with a 1.5 percent teacher cost difference.

"...districts located in faster growing regions, regions with climates characterized by colder temperatures and greater quantities of snowfall, and regions with higher rates of crime pay higher relative salaries to teachers..."

- **Climatic conditions.** Teachers appear to give up salaries to work in regions with warmer climates (as measured by mean temperatures) and/or less annual snowfall. Districts in regions exhibiting mean temperatures one standard deviation below the mean have 2.8 percent higher teacher costs. An additional standard deviation above the mean in snowfall is associated with a teacher cost difference of 1.3 percent.

The differences in teacher salaries associated with these variables are *cost differences*. They reflect the variations in salaries paid to comparable teachers working in similar job assignments across local school systems. That is, all else equal, districts in more urbanized settings tend to pay higher relative salaries for comparable teachers. In addition, districts located in faster growing regions, regions with climates characterized by colder temperatures and greater quantities of snowfall, and regions with higher rates of crime pay higher relative salaries to teachers, holding all else constant. At the same time, districts in more remote regions pay somewhat higher-than-average salaries to compensate for reduced access to some of the amenities of living in more urbanized areas.[6]

Teacher Cost Differences by State

Table 1 presents state-by-state and overall patterns of variation in the TCI. It designates the number of districts for which data are included, along with the weighted mean, standard deviation, and minimum and maximum values of the index within each state. The overall mean value of the TCI for the United States is scaled to a value of 100. This means that the index is scaled so that the average student attends a district with a TCI value of 100. The variation in the TCI across the United States ranges from a low of 53 to a high of 137. This means that teacher costs for a

[6] The TCI described in this paper is based on what was referred to as the *regional-level TCI* in Chambers and Fowler (1995). The *regional-level TCI* includes only regional- or county-level variables in the computation of the index. A district-level TCI, which is calculated in the full report (Chambers 1995), includes both regional, as well as district-level variables in the index. Only the *regional-level TCI* is presented in this paper, since the regional factors are more easily interpreted and the standard error of the regional-level TCI is smaller than for the *district-level TCI*.

Table 1.—State-by-state estimates of the teacher cost index (TCI)

State	Number of districts	Total enrollment	Descriptive statistics on TCI			
			Mean	Standard deviation	Minimum	Maximum
United States	14,494	40,116,027	100	11.7	53	137
Alaska	36	94,330	114	8.0	96	137
Alabama	129	725,115	88	5.4	76	97
Arkansas	322	431,490	87	4.1	78	97
Arizona	205	630,816	97	6.9	84	106
California	991	4,813,643	109	7.6	77	119
Colorado	176	573,985	99	7.6	71	116
Connecticut	160	453,468	114	3.9	103	118
District of Columbia	1	80,694	107	0.0	107	107
Delaware	16	96,384	102	4.2	96	106
Florida	67	1,862,185	95	5.4	79	107
Georgia	184	1,150,172	92	8.8	71	106
Hawaii	1	159,285	92	0.0	92	92
Iowa	429	483,176	90	4.7	76	98
Idaho	110	217,555	94	4.7	72	102
Illinois	942	1,795,477	107	13.1	72	120
Indiana	295	937,324	98	6.3	80	106
Kansas	302	436,494	88	7.6	58	99
Kentucky	176	630,091	89	5.5	76	99
Louisiana	65	774,724	85	3.9	74	92
Massachusetts	269	730,024	114	3.8	88	120
Maryland	22	669,620	104	5.7	86	112
Maine	215	208,599	104	4.4	95	111
Michigan	552	1,560,809	105	7.5	86	115
Minnesota	429	751,268	99	8.9	73	111
Missouri	538	805,029	95	9.0	71	107
Mississippi	149	491,684	84	3.8	74	91
Montana	503	148,411	94	5.2	76	119
North Carolina	133	1,084,489	93	5.1	80	101
North Dakota	262	117,531	89	5.3	68	111
Nebraska	728	269,106	90	6.9	58	118
New Hampshire	148	163,778	109	3.9	101	113
New Jersey	534	1,007,162	113	4.5	96	119
New Mexico	86	296,471	90	5.2	74	97
Nevada	17	201,316	95	4.1	87	108
New York	627	2,361,043	115	12.7	89	129
Ohio	610	1,766,733	102	6.5	83	113
Oklahoma	586	568,711	87	4.3	68	95
Oregon	292	483,507	100	6.5	72	108
Pennsylvania	499	1,629,157	106	8.0	86	120
Rhode Island	36	136,086	111	1.7	108	112
South Carolina	80	451,308	90	5.9	79	102
South Dakota	172	125,316	87	4.4	53	92
Tennessee	132	819,229	90	4.8	77	98
Texas	1,042	3,380,805	93	8.3	70	106
Utah	40	444,832	97	4.4	73	110
Virginia	129	984,702	96	8.2	75	108
Vermont	236	90,215	101	2.7	95	108
Washington	294	810,011	106	9.1	75	116
Wisconsin	424	796,114	99	6.7	85	109
West Virginia	54	318,577	86	3.0	78	93
Wyoming	49	97,976	88	4.4	78	107

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1990–91.

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district located in the lowest cost region of the United States are 53 percent of those faced by the district serving the average student. The highest cost district pays 37 percent higher teacher costs than the district serving the average student. The lowest cost region of the United States is located in South Dakota, while the highest cost region is located in Alaska. Another way of looking at these numbers suggests that districts in the highest cost regions of the country pay 2.6 times (= 137/53) as much to place comparable teachers in comparable classrooms and schools as districts in the lowest cost regions of the country. The standard deviation of the TCI is 11.7 percent; that is, most of the districts are within plus or minus 11.7 percent of the average.

The five states with the *highest average teacher costs* are, in order from highest to lowest, New York (115), Massachusetts (114), Connecticut (114), Alaska (114), and New Jersey (113). Four of these states are located in the northeastern portion of the United States. Calculations of standard errors indicate that the differences among the top five states are not statistically significant.[7]

The five states with the highest average teacher costs are New York, Massachusetts, Connecticut, Alaska, and New Jersey.

The five states with the *lowest average teacher costs* are, in order from lowest to highest, Mississippi (84), Louisiana (85), West Virginia (86), Oklahoma (87), and South Dakota (87). Four of these states are located in the South (using the state classification scheme provided in SASS). Once again, based on the standard errors of these estimates, none of the differences among the lowest five states is statistically significant.

The five states with the *largest within-state variation* in TCI values (based on the size of the standard deviations presented in the table) are Illinois, New York, Washington, Missouri, and Minnesota. The states with the *lowest within-state variation*[8] are Rhode Island, Vermont, West Virginia, Massachusetts, and Mississippi. In general, states with larger numbers of school districts tend to have a larger variance. Among the five states that exhibited the highest within-state variation, the average number of districts per state is 566, while the average number of districts in the five states with the lowest within-state variation is 149.

Teacher Cost Differences, by Type of District

Table 2 presents the descriptive statistics for the TCI broken down by region of the United States, level of per-pupil revenue in the district, population of the metropolitan area or county of location, distance from the central city, district enrollment, type of city, and percentage of students living in poverty.

Highlights of the pattern of variations in the TCI are presented below.

- **Regional variation.** The average TCI tends to be lowest in the southern part of the United States and highest in the northeastern states. Using the regional-level TCI, on average, students in the South are enrolled in districts facing teacher costs of about 8.1 percent below average, while students in the Northeast are enrolled in districts facing costs of more than 11.5 percent above average for similar teachers in similar schools. Districts in the West exhibit teacher costs of

[7] The standard errors of the statewide average index values are generally below 1 percentage point for all but 13 states. Thus, a 95 percent confidence interval for the vast majority of states would be smaller than plus or minus 2 percent. With the exception of Alaska, the standard errors of the five highest cost states range from 0.6997 in Connecticut to 1.3580 in New York. The standard error for the statewide average in Alaska is 2.1859. The standard error is higher for districts further away from the overall average.

[8] This excludes Hawaii and the District of Columbia, each of which have only one district.

Table 2.—The TCI, by region, per-pupil revenue, metropolitan population, distance from the nearest central city, district size, type of city, and percentage of children living in poverty

Category	Number of districts	Total enrollment	Descriptive statistics on TCI			
			Mean	Standard deviation	Minimum	Maximum
Region						
Northeast	2,724	6,779,532	112	9.7	86	129
Midwest	5,683	9,844,377	100	10.4	53	120
South	3,287	14,519,980	92	7.8	68	112
West	2,800	8,972,138	104	9.7	71	137
Per-pupil revenue						
Less than $4,000	3,695	8,903,340	91	8.1	65	119
4,000–6,000	7,122	22,072,043	99	10.0	53	120
6,000–8,000	2,316	7,257,311	110	10.9	58	129
8,000–10,000	797	1,382,471	111	7.6	62	123
More than 10,000	564	500,862	114	7.4	65	137
Metropolitan population						
Less than 5,000	686	166,555	84	9.2	53	119
5,000–20,000	3,341	2,521,938	85	6.3	66	137
20,000–50,000	2,999	4,170,191	88	5.8	72	123
50,000–100,000	1,519	3,201,822	92	5.9	78	112
100,000–500,000	2,458	8,348,309	95	7.2	73	119
500,000–1,000,000	1,188	5,578,574	100	7.8	85	118
More than 1,000,000	2,303	16,128,638	110	8.7	84	129
Distance from the nearest central city						
Less than 10 miles	2,018	15,477,412	102	9.9	73	120
10–20	2,369	8,832,810	107	11.9	68	129
20–40	3,973	8,186,292	97	10.5	68	120
40–80	3,770	5,695,551	90	7.9	58	119
80–160	1,885	1,576,681	90	7.7	53	119
More than 160	479	347,281	100	11.2	65	137
District size						
Less than 500 students	5,154	1,103,979	91	10.3	53	137
501–1,000	2,370	1,712,255	94	10.3	63	134
1,001–5,000	5,374	12,270,304	98	11.3	71	137
5,001–10,000	915	6,317,093	99	11.2	75	123
10,001–25,000	480	7,135,233	100	10.4	72	119
25,001–50,000	120	4,081,084	100	9.5	73	119
50,001–100,000	44	2,960,552	100	7.8	85	120
More than 100,000	21	4,523,514	111	12.2	91	129
Type of city						
Large central city	811	8,579,610	108	10.9	83	129
Mid-size city	806	9,187,913	97	8.5	73	119
Urban fringe of large city	1,287	5,921,311	110	7.7	81	120
Urban fringe of mid-size city	810	2,861,090	99	10.0	71	118
Large town	418	1,154,387	92	8.5	58	119
Small town	4,158	8,812,909	93	9.9	70	137
Rural	6,174	3,596,914	92	8.7	53	137
Percentage of children living in poverty						
Less than 10%	4,808	11,733,121	105	8.5	62	134
10–20	4,834	13,299,197	97	9.0	53	137
20–40	3,656	12,941,309	99	14.5	58	137
More than 40	875	1,700,075	93	12.4	62	119

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1990–91.

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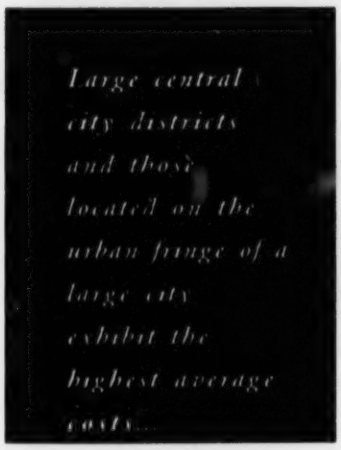
about 4.4 percent above average, while districts in the Midwest are close to the U.S. average.

- **Urbanicity.** Not surprisingly, districts with higher per-pupil revenues, districts located in larger metropolitan areas, districts less than 20 miles from a central city, districts with greater enrollments, and more urbanized districts all tend to have higher teacher costs. Large central city districts and those located on the urban fringe of a large city exhibit the highest average costs among types of cities—about 8.2 to 9.5 percent above average. Districts within 20 miles of the central city exhibit the highest costs, while districts between 40 and 80 miles of the central city exhibit the lowest costs. Districts more than 160 miles from the central city show costs just slightly below that of districts within the 20 mile radius. Districts in the largest metropolitan areas (over one million in population) exhibit costs that are almost 10 percent above average, while districts in regions or counties with a population of less than 5,000 exhibit costs that are more than 16 percent below average. Districts located in metropolitan areas of half a million to a million in population exhibit costs at the U.S. average.



- **Rural school districts.** While the average student attending school in a rural district would have access to the average teacher at a cost of about 8 percent below average (i.e., an index value of 92), the student attending school in a remotely-located district would have access to that same teacher at about the average cost (i.e., an index value of 100). Although competitive forces in the labor market might tend to drive salaries down in such districts, the results suggest that compensating differentials are necessary to attract teachers into remote regions located away from the amenities of urban life.

A Comparison of Alternative Models: The Case for the TCI

In addition to the TCI derived from the hedonic wage model, two alternative cost adjustments have been proposed: (1) a geographic cost-of-living (COL) index (McMahon and Chang 1991), and (2) an index of variations in average teacher salaries adjusted for differences in teacher education and experience (Barro 1994). As one would expect, the correlations between the TCI, the McMahon-Chang COL, and Barro's adjusted-average-teacher salary index are positive and relatively high (i.e., 0.76 and 0.72, respectively). However, there are significant differences in the values of these indices and what they represent. The COL accounts only for variations in the cost of living which, while an important part of teacher cost differences, does not capture all of the relevant factors (e.g., the effects of labor market competition, climate, crime, and urban amenities). The Barro index controls for teacher education and experience, but fails to control for variations in other teacher and school attributes that are within local control.

The potential for distortion between the TCI and COL is evident from a more detailed examination of the patterns of difference across the United States. For example, the COL values for the highest COL regions of the country—the metropolitan areas surrounding the cities of San Francisco and San Jose, California—exceed the average values of the TCIs for these same regions by more than 28 percentage points. These values represent significant differences in the perception of what constitutes high costs and provide a very different picture of the real purchasing power of the educational dollar. These results suggest that

teachers are willing to trade salaries for the amenities of living in the San Francisco-San Jose areas. The state of Hawaii shows a similar pattern.

The TCI presented in this paper represents an attempt to account for most of the factors that affect the ability of local school systems to recruit and employ teachers with similar characteristics hired into similar jobs and job assignments. It accounts systematically for the factors that underlie differences in the cost of living, and for differences in regional amenities that affect the attractiveness of places to live and work. Despite the high correlations among these three models, there are some important differences in the ordering of regions of the country according to these alternative indices, as well as the magnitudes themselves. Using an inappropriate index for adjusting salary or expenditure data can lead to significantly different conclusions about the levels of educational services being provided in different regions of the country.

[The TCI] accounts... for the factors that underlie differences in the cost-of-living, and for differences in regional amenities that affect the attractiveness of places to live and work.

Future Work

Future work on the analysis of teacher compensation could be improved along two dimensions. First, additional data items are needed to control for teacher quality (e.g., the quality of colleges attended, scores on Scholastic Assessment Tests (SATs), or national teacher exams). A second area in which data could be improved is benefits received by teachers. The current SASS does not report data that would permit determination of the value of benefits, which could easily add as much as 30-40 percent to teacher salaries. In addition, future research in this area should expand the analysis of teacher salaries to other certified and noncertified personnel, as well as nonpersonnel resources. While it is expected that patterns of school administrator costs will be similar to those for teachers, noncertified personnel tend to operate in more localized labor markets, and in the past have been found to have somewhat different patterns of cost variation than certified personnel (Chambers 1978). Finally, in order to develop a comprehensive cost-of-education index, it will be necessary to obtain some data on the variations in the costs of nonpersonnel resources, which account for approximately 15 percent of school budgets.

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Before joining The Finance Project, Dr. Orland spent three years as a senior official with the National Education Goals Panel (twice he was named Acting Director), and six years prior to that position he was a senior analyst with the National Center for Education Statistics and the U.S. Department of Education's Office of Research. A Political Scientist by training, Dr. Orland received his doctorate from Syracuse University's Maxwell School in 1978. Over the course of his career, he has authored over 40 scholarly publications and government reports on public policy, finance, and governance issues.

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Meeting the Challenge of Devolution: How Changing Demographic and Fiscal Contexts Affect State Investments in Education

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Introduction

As the direction of public policy points unambiguously to a larger state and local leadership role in delivering and paying for public services, the near- and long-term fiscal outlook for states takes on added relevance to those interested in education finance. The impending devolution of program responsibility and authority from Washington, DC to states and localities means that these governments increasingly will be expected to design and fund strategies for meeting the needs of their citizens. What financing challenges is the education sector likely to face in light of this changed context? What policy implications are suggested by this financing outlook?

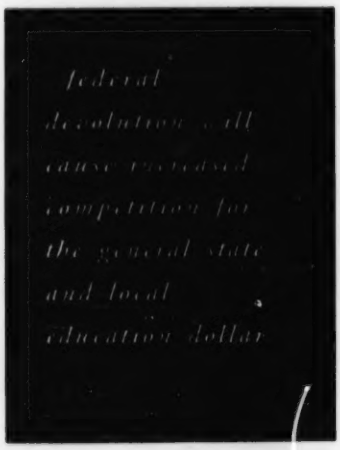
Unlike most other children's services, education revenue is derived almost exclusively from state and local sources. The overall proportion of federal financial support for elementary and secondary education is currently under 7 percent. So, at first glance, it might seem as though a smaller federal role would not have much impact on education service provision. However, upon closer inspection, it is clear that federal devolution can be expected to affect education financing in at least two ways. First, states and school districts will be increasingly called upon to provide financing to support the special categories of funding in which federal financing currently plays a major role. For instance, disadvantaged students, students with disabilities, and the limited English proficient (LEP) have for years been particularly dependent on targeted federal assistance programs. More recently, through programs such as Goals 2000 and the School-to-Work Opportunities Act, the federal government has begun to provide states and school districts with the marginal resources needed to

NOTE: This paper is adapted form Martin E. Orland and Carol E.Cohen. *State Investments in Education and Other Children's Services: The Fiscal Challenges Ahead*, prepared for The Finance Project, Washington, DC, September, 1995.

stimulate broad system-wide education reforms grounded in the principle of all students achieving at dramatically higher levels.

Perhaps even more significantly, federal devolution will cause increased competition for the general state and local education dollar. As federal payments for programs like welfare and Medicaid are reduced, additional pressures will be placed on state and local budgets to accommodate the shortfalls. Because education comprises such a large share of state and local budgets (about 38 cents of every state and local tax dollar in 1992), it may become an especially inviting revenue target.

To what extent will the education sector in states and local communities be equipped to meet the financial challenges brought on by a declining federal role? Answering this question satisfactorily requires that we appreciate the factors most directly associated with patterns and trends in education spending. Even a cursory look at average per-pupil expenditure levels reveals how much spending variability exists both across the states and over time. In 1992, real per-pupil spending was over three times higher in New Jersey than in Utah. Even more dramatically, while average per-pupil education spending rose $110 per year between 1970 and 1989, it increased at a rate of only $15 per year between 1990 and 1994.



The purpose of this analysis is to better understand what drives spending contrasts like these, and what this portends for future spending on education. It is our hope that such an understanding will enable policymakers at all levels to make more informed decisions on public educational investments.

Analytic Approach and Framework

This study analyzes the fiscal challenges ahead for states in financing education by examining patterns of state spending for these services and the major factors that influence them. In addition to examining recent cross-sectional state data on per-pupil education spending, we look at spending changes between 1970, 1980, and 1992. Our approach is based on the assumption that the factors and relationships that are significant in explaining current and recent state spending will continue to affect such spending in the future.

The hypothesis framing our analysis is that three broad factors can influence state spending for education:

- the *service needs* (or the demographic capacity) of states to provide education services;
- the *ability to pay* (or the fiscal capacity) of states to provide such services; and
- the *willingness to pay* (or the fiscal effort) of states and localities in support of these services.

The relevance of each of these factors to the level of per-pupil education spending in each state is highlighted below.

Service Needs (Demographic Capacity)

The magnitude of each state's overall need for educational services can have a major impact on the amount of resources that state invests in each pupil. In this study, we measure this factor, which we have

labeled its demographic capacity, by determining a state's *ratio of population to pupils.*[2] All else being equal, states that are able to spread their educational costs across a larger population base (i.e., those with higher population to pupil ratios), can more easily generate a given level of per-pupil spending than can states with greater numbers of students relative to their population.

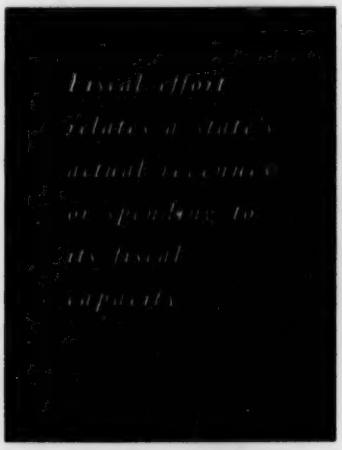
Ability to Pay (Fiscal Capacity)

The ability to pay, or fiscal capacity, of a state can also have a major impact on per-pupil education spending. A state's fiscal capacity represents the potential of that state to generate resources for public purposes. Thus, the higher the level of a state's fiscal capacity, the greater its presumed ability to fund all public services, including education. Likewise, the stronger the growth of fiscal capacity, the greater a state's ability to increase spending for those services.

As with indicators of need, there are many possible choices for indicators of state fiscal capacity. Some, such as per capita income, are based on broad measures of economic activity within a state, while others, such as the Representative Tax System developed by the Advisory Commission on Intergovernmental Relations, focus more directly on the revenue-raising potential of state and local governments. In addition, some measures are better able to capture the potential of states to export taxes to, or raise revenues from, non-residents than are others. Nevertheless, the fiscal capacity indices for most states tend to differ little depending on what measure is used, except in those states with relatively large oil production or tourism industries, where the potential for tax exporting is the greatest.

In this study, we use *per capita personal income* as the indicator of a state's ability to pay for educational services. Per capita income is a major component of a state's capacity to raise revenues for public services, because most taxes are paid from the income of a state's residents. Per capita income is the most widely used indicator of fiscal capacity, and the most readily available for the years examined in this study.[3]

Willingness to Pay (Fiscal Effort)



The third major factor that can affect state per-pupil education spending is a state's willingness to pay for education. Willingness to pay is captured by the fiscal effort a state makes. Fiscal effort relates a state's actual revenues or spending to its fiscal capacity. Because fiscal capacity varies across states, a state with lower fiscal capacity will have to use a greater share of its capacity to achieve the same service levels as a state with higher fiscal capacity (all else being equal) and vice versa. Fiscal effort thus provides a measure of the relative burden placed on a state's resources, or the effort made to achieve the service levels that are provided.[4]

Fiscal effort can be measured for the total of all revenues or spending (i.e., the overall fiscal effort of a state) or for selected categories. In this study, we use *education spending per $100 of personal income* as our measure of fiscal effort for education. Because we use personal income (on a per capita basis) as our

[3] This ratio is an admittedly incomplete proxy of state service need or demographic capacity, but one that appears well-suited to the aggregate state-level analysis appearing in this paper. More refined measures would be expected to include other student population characteristics, such as numbers from low-income families, numbers with limited English proficiency, numbers with disabilities, etc.

[3] This study focuses on states' spending for education from their own resources. The concept of fiscal capacity used in this study does not include federal aid. Although federal grants to states can be expected to affect their ability to finance educational services and major reductions in the size of these grants are likely, these impacts will be discussed separately from the influence of state fiscal capacity.

[4] Fiscal effort may be a flawed proxy for willingness to pay if there are external constraints on spending levels, such as federal mandates, court orders, or state constitutional requirements for allocating funding.

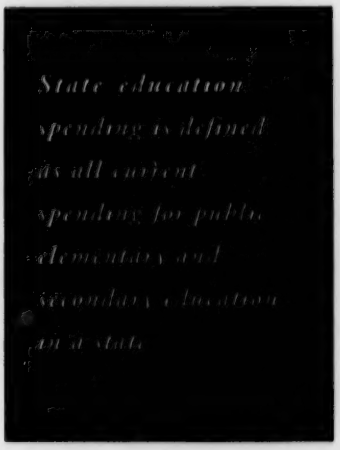
indicator of fiscal capacity, we also use it in defining our measure of fiscal effort.

Relationship of Service Needs, Ability to Pay, and Willingness to Pay

We have noted above that service needs (or demographic capacity), ability to pay (or fiscal capacity), and willingness to pay (or fiscal effort) can each independently affect state per-pupil spending levels. Gold developed an approach describing how these factors interrelate in each state to affect spending using the following mathematical identity.

School Spending/Pupils = Spending/Income Income/ Population * Population/Pupils*

In this equation, we see that education service levels (school spending per-pupil) is a multiplicative function of fiscal effort (spending in relation to personal income); fiscal capacity (per capita income); and demographic capacity (the ratio of population to pupils). The mathematical identity, in effect, decomposes state per-pupil spending levels into demographic capacity, fiscal capacity, and fiscal effort components. As discussed later in this paper, by relating each component in a state to its corresponding value for the United States as a whole, its relative contribution in explaining that state's spending can be observed.



Features of Our Presentation and Data

Our analysis primarily examines national patterns and trends in the data and discusses what they are likely to mean for most states in the future. Because of the great variation among states, however, we also present state-by-state data and highlight significant variations among states or regions where they exist.[5]

Our work relies on data compiled by Steven D. Gold et al. and published in *State Investments In Education and Other Children's Services: Fiscal Profiles of the 50 States,* as well as an analysis prepared for The Finance Project by the same authors. That database contains state-by-state data and national data on state spending for education (as well as other children's services) and related economic and demographic factors. Some of the features of that database are described below.

Definition of State Education Spending

State education spending is defined as all current spending for public elementary and secondary education in a state. It excludes expenditures for capital improvement and focuses only on ongoing expenditures for K–12 education. Education spending includes spending from federal revenue sources. However, because the federal contribution to state elementary-secondary education spending is relatively small (in 1992, less than 7 percent[6]), this measure of education spending primarily reflects the commitment of states, including their local governments, to education spending from their own resources.

Time Periods

The database includes education data for 1992, the most recent year for which all the data were available, as well as historical data for 1970, 1980, and 1992.

[5] Intrastate variations in spending and other variables can be as large or larger than interstate variations. Discussion of the extent and significance of intrastate variations is beyond the scope of this analysis.

[6] Although the federal contribution to education spending ranged as high as 17.7 percent in one state (Mississippi), in 40 of the 50 states, the federal contribution was less than 10 percent.

Adjustments for Inflation and Differences in Price Levels

Inflation reduces the value of a dollar of spending over time. To adjust for this effect, all fiscal data are presented in 1992 constant dollars.[7] Our comparisons of revenue, spending, and income data over time thus represent real changes in the levels of these variables, after accounting for the effects of inflation.

Likewise, differences in price levels among locations can bias interstate comparisons because of their effect on the purchasing power of families and governments. A family with a $40,000 annual income in Boston, for example, has much less purchasing power than one with the same income living in Jackson, Mississippi. However, because valid and reliable state-level price-adjusted data are less readily available over time than non-adjusted data, most of the data in this report are unadjusted. In those instances where we have used an existing index to adjust for interstate price-level differences (see, for example, table 1), the results suggest that such adjustments narrow but do not eliminate the wide variations among states.[8]

Key Findings: Patterns and Trends in Education Spending

Elementary and secondary education constitutes by far the largest single category of spending by state and local governments. In 1992, states devoted 34 percent of their tax revenues to finance K–12 education, compared to about 20 percent for health, 12 percent for higher education, and 8 percent for social welfare. Thirty-eight cents of every state and local tax dollar that year supported education.

Elementary and secondary education constitutes by far the largest single category of spending by state and local governments

The magnitude of state and local educational investments should not obscure the fact that states vary considerably in both their levels of education spending and rates of expenditure growth. As noted earlier, New Jersey spent over $9,000 per-pupil in 1992, a figure that is about three times greater than that for Utah. Even when spending is adjusted for differences in the cost of living, substantial differences remain (see table 1). And while the last two decades were periods of substantial real growth in educational expenditures overall (see table 2), spending disparities among the states have remained relatively constant (see table 3).

In this section, we attempt to document factors that influence education spending. Specifically, we address the question of how strongly indicators of demographic capacity (service needs), fiscal capacity (ability to pay), and fiscal effort (willingness to pay) can explain spending patterns and trends among the states. To the extent that any of these factors appear salient, we can use this knowledge to make more informed judgments regarding the prospects for education spending in the future.

We begin this discussion by examining data on demographic capacity, fiscal capacity, and fiscal effort between 1970 and 1992. We then relate these factors to changes nationally in per-pupil spending levels over this period, as well as to differences among the states in per-pupil spending. Finally, we discuss the implications of these findings for future education spending.

[7] Data on education spending were adjusted using the implicit price deflator for state and local government purchases. Per capita income date were adjusted using the fixed-weight personal consumption expenditure deflator.

[8] There have been at least two recent efforts to develop indices of state price-level differences. The index used in this report to illustrate the effect of adjusting state education spending for price level differences was developed by F. Howard Nelson of the American Federation of Teachers Research Department. Another index used in this report to adjust state fiscal capacity was developed by Herman Leonard and Monica Pryar.

Table 1.–Current education spending per-pupil, by state: 1992

State	Unadjusted Spending	Index (U.S. = 100)	Spending Adjusted for Cost Differences*	Index (U.S. = 100)
United States	$5,421	100	$5,421	100
New Jersey	9,317	172	7,302	135
New York	8,527	157	7,251	134
Alaska	8,450	156	6,387	118
Connecticut	8,017	148	6,258	115
Vermont	6,944	128	6,855	126
Maryland	6,679	123	5,808	107
Pennsylvania	6,613	122	6,186	114
Rhode Island	6,546	121	6,017	111
Massachusetts	6,408	118	5,344	99
Michigan	6,268	116	6,725	124
Wisconsin	6,139	113	6,658	123
Delaware	6,093	112	5,544	102
Oregon	5,913	109	6,231	115
Wyoming	5,812	107	6,144	113
New Hampshire	5,790	107	5,341	99
Ohio	5,694	105	6,116	113
Illinois	5,670	105	5,870	108
Maine	5,652	104	5,618	104
Montana	5,423	100	5,901	109
Hawaii	5,420	100	4,091	75
Minnesota	5,409	100	5,760	106
Washington	5,271	97	5,368	99
Nebraska	5,263	97	5,835	108
Florida	5,243	97	5,687	105
Colorado	5,172	95	5,219	96
West Virginia	5,109	94	5,872	108
Iowa	5,096	94	5,669	105
Indiana	5,074	94	5,600	103
Kansas	5,007	92	5,594	103
Nevada	4,926	91	5,027	93
Virginia	4,880	90	5,304	98
Missouri	4,830	89	5,279	97
California	4,746	88	4,280	79
Kentucky	4,719	87	5,356	99
Texas	4,632	85	5,147	95
North Carolina	4,555	84	5,067	93
North Dakota	4,441	82	4,979	92
South Carolina	4,436	82	4,995	92
Arizona	4,381	81	4,554	84
Georgia	4,375	81	4,850	89
Louisiana	4,354	80	4,937	91
South Dakota	4,173	77	4,699	87
Oklahoma	4,078	75	4,618	85
Arkansas	4,031	74	4,602	85
New Mexico	3,765	69	4,088	75
Tennessee	3,692	68	4,148	77
Alabama	3,616	67	4,100	76
Idaho	3,556	66	3,891	72
Mississippi	3,245	60	3,738	69
Utah	3,040	56	3,304	61
Ratio between Highest- and Lowest-Spending States	3.1 to 1		2.2 to 1	
50-State Average	5,330		5,384	
Standard Deviation	1,323		889	
Coefficient of Variation	0.25		0.17	

* Spending adjusted by cost index prepared by F. Howard Nelson, American Federation of Teachers.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*, Table 166, p. 165, reported in Steven D. Gold et al. "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995.

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Table 2.–Percentage change in real current per-pupil spending, by region: 1970–80, 1980–92, and 1970–92

Region	State	1970–80	1980–92	1970–92
United States		26.6	37.0	73.4
New England	Connecticut	15.7	90.2	120.0
	Maine	19.9	77.9	113.2
	Massachusetts	49.2	30.5	94.7
	New Hampshire	20.5	73.5	109.0
	Rhode Island	32.7	44.5	91.8
	Vermont	12.5	99.6	124.6
Mid-Atlantic	Delaware	44.5	22.2	76.7
	Maryland	28.7	47.6	89.9
	New Jersey	42.8	67.6	139.3
	New York	18.6	41.4	67.7
	Pennsylvania	30.7	49.7	95.7
Great Lakes	Illinois	29.4	25.8	62.8
	Indiana	17.5	54.8	81.9
	Michigan	32.8	36.3	81.0
	Ohio	29.2	57.5	103.6
	Wisconsin	27.6	42.3	81.5
Plains	Iowa	25.3	25.8	57.6
	Kansas	28.2	32.3	69.5
	Minnesota	20.1	30.1	56.2
	Missouri	24.2	43.2	77.8
	Nebraska	32.8	40.5	86.6
	North Dakota	26.5	32.8	68.0
	South Dakota	25.7	25.5	57.8
Southeast	Alabama	34.7	28.8	73.5
	Arkansas	26.0	47.0	85.2
	Florida	17.3	59.3	86.9
	Georgia	25.7	54.5	94.2
	Kentucky	41.9	59.2	126.0
	Louisiana	25.7	39.5	75.4
	Mississippi	51.0	11.9	69.1
	North Carolina	30.3	49.1	94.3
	South Carolina	30.0	45.3	88.9
	Tennessee	31.3	29.6	70.2
	Virginia	26.5	42.2	79.9
	West Virginia	30.3	52.7	99.0
Southwest	Arizona	24.5	27.6	58.8
	New Mexico	30.8	6.2	39.0
	Oklahoma	45.0	21.5	76.2
	Texas	39.6	38.8	93.7
Rocky Mountain	Colorado	49.2	22.6	82.9
	Idaho	25.1	23.0	53.9
	Montana	44.0	25.7	81.0
	Utah	20.4	5.3	26.7
	Wyoming	34.2	32.0	77.2
Far West	Alaska	91.4	2.6	96.4
	California	18.9	20.1	42.9
	Hawaii	25.5	34.0	68.2
	Nevada	23.5	35.4	67.2
	Oregon	32.3	26.1	66.8
	Washington	27.6	17.8	50.4

NOTE: Number of pupils is average daily attendance.
SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*, Table 166, p. 165, reported in Steven D. Gold et al. "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995.

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Table 3.–Real current education spending per-pupil, by region: 1970, 1980, and 1992 (in 1992 constant dollars)

Region	State	1970	1980	1992
New England	Connecticut	$3,644	$4,216	$8,017
	Maine	2,651	3,178	5,652
	Massachusetts	3,291	4,911	6,408
	New Hampshire	2,770	3,338	5,790
	Rhode Island	3,414	4,531	6,546
	Vermont	3,092	3,479	6,944
Mid-Atlantic	Delaware	3,448	4,984	6,093
	Maryland	3,517	4,526	6,679
	New Jersey	3,893	5,559	9,317
	New York	5,084	6,031	8,527
	Pennsylvania	3,379	4,416	6,613
Great Lakes	Illinois	3,483	4,507	5,670
	Indiana	2,789	3,279	5,074
	Michigan	3,464	4,599	6,268
	Ohio	2,797	3,615	5,694
	Wisconsin	3,383	4,315	6,139
Plains	Iowa	3,234	4,052	5,096
	Kansas	2,954	3,786	5,007
	Minnesota	3,464	4,159	5,409
	Missouri	2,716	3,373	4,830
	Nebraska	2,820	3,746	5,263
	North Dakota	2,644	3,345	4,441
	South Dakota	2,644	3,324	4,173
Southeast	Alabama	2,084	2,808	3,616
	Arkansas	2,176	2,742	4,031
	Florida	2,805	3,291	5,243
	Georgia	2,253	2,831	4,375
	Kentucky	2,088	2,963	4,719
	Louisiana	2,483	3,122	4,354
	Mississippi	1,920	2,899	3,245
	North Carolina	2,345	3,056	4,555
	South Carolina	2,349	3,052	4,436
	Tennessee	2,169	2,848	3,692
	Virginia	2,713	3,432	4,880
	West Virginia	2,567	3,345	5,109
Southwest	Arizona	2,759	3,434	4,381
	New Mexico	2,709	3,544	3,765
	Oklahoma	2,314	3,355	4,078
	Texas	2,391	3,338	4,632
Rocky Mountain	Colorado	2,828	4,218	5,172
	Idaho	2,310	2,890	3,556
	Montana	2,996	4,314	5,423
	Utah	2,398	2,887	3,040
	Wyoming	3,280	4,402	5,812
Far West	Alaska	4,303	8,237	8,450
	California	3,322	3,951	4,746
	Hawaii	3,222	4,045	5,420
	Nevada	2,946	3,638	4,926
	Oregon	3,544	4,690	5,913
	Washington	3,506	4,474	5,271
50-State Average		2,947	3,862	5,330
Range		3,165	5,495	6,277
Standard Deviation		605	971	1,323
Coefficient of Variation		0.21	0.25	0.25

NOTE: Number of pupils is average daily attendance.
Figures were adjusted by the State and Local Government Implicit Price Deflator from the Economic Report of the President (1992=100).
SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*, Table 166, p. 165, reported in Steven D. Gold et al. "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995; and calculations by The Finance Project.

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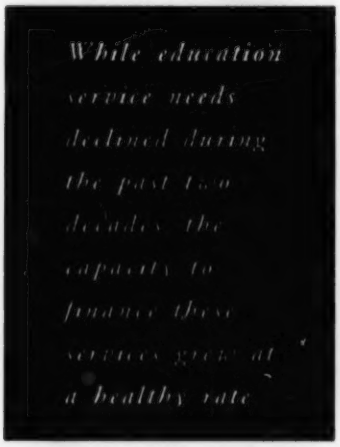
Education Spending and Demographic Capacity: The Importance of the Relative Size of the School Population

Our indicator of the need for educational services in a state (or its demographic capacity) is the size of the total population relative to the number of children enrolled in the public schools. As noted in the previous section, the higher a state's ratio of population to pupils, the higher its demographic capacity, and vice versa. By this measure, demographic capacity to support per-pupil education spending increased by 26 percent between 1970 and 1992. Growth occurred in every state and was especially pronounced during the 1970s. States with the highest demographic capacity tend to be overwhelmingly in the Northeast and Great Lakes regions, while those with the lowest demographic capacity are consistently found among the Southwest and Rocky Mountain states (see table 4).

As suggested earlier, higher demographic capacity should be good news for per-pupil education spending. This is because the financial burden of educating children who are in the public education system can be spread among more taxpayers. Conversely, having more pupils relative to the population at large would be expected to make it more difficult to generate high per-pupil spending levels. Simple correlations appear to support this hypothesis. In 1992, the correlation between our measure of education need and per-pupil education spending was -0.51, while the correlation between percentage enrollment growth and per-pupil spending growth (between 1970 and 1992) was -0.26.


While education service needs declined during the past two decades, the capacity to finance these services grew at a healthy rate

[9] These regional patterns remain mostly intact after adjusting fiscal capacity for interstate differences in the cost of living. The effect of adjusting for cost-of-living differences is to reduce the variation in fiscal capacity among states. For example, after adjustment, the overall fiscal capacity index of the New England region falls from 117 to 107, while that of the Southeast region rises from 89 to 97.

Education Spending and Fiscal Capacity: The Importance of the Size of the Revenue Pie

While education service needs declined during the past two decades, the capacity to finance these services grew at a healthy rate. As measured by changes in real per capita income, state fiscal capacity grew by 31 percent in the 1970s, and 17 percent between 1979 and 1991 (see table 5). State growth patterns were generally consistent with national trends during both decades, with the notable exception of most of the New England and Mid-Atlantic states, where gains were stronger between 1979 and 1991 than they were between 1969 and 1979. Most high-capacity states can be found in the New England and Mid-Atlantic regions, while low-capacity states tend to predominate in the Southeast, Southwest, and Rocky Mountain areas.[9]

Obviously, all things being equal, fiscally strong states can support generous per-pupil education spending levels more easily than can states with a poorer resource base. We would thus expect to see both higher levels of per-pupil spending in states with greater fiscal capacity, and also higher rates of per-pupil spending growth among states where fiscal capacity gains were greatest. Simple correlations reveal a strong relationship between per capita income and per-pupil spending for 1992 (0.80) and a weaker, but still substantial, relationship between 1970 to 1992 changes in per capita income and changes in per-pupil spending (0.52).

Education Spending and Fiscal Effort: The Importance of Educational Resource Commitments

As noted earlier, the degree to which a state taps its available resource capacity, or its fiscal effort, is a third factor explaining per-pupil education spending.

Table 4.–Ratio of population to public school enrollment, by region: 1970, 1980, and 1992

Region	State	1970	1980	1992	1992 Rank
United States		4.42	5.39	6.00	
New England	Connecticut	4.64	5.47	6.70	7
	Maine	4.13	4.94	5.71	28
	Massachusetts	4.92	5.55	7.08	1
	New Hampshire	4.76	5.35	6.26	11
	Rhode Island	5.15	6.19	7.06	2
	Vermont	4.37	5.12	5.85	24
Mid-Atlantic	Delaware	4.14	5.76	6.66	8
	Maryland	4.34	5.43	6.61	9
	New Jersey	4.88	5.73	7.00	4
	New York	5.26	5.94	6.83	6
	Pennsylvania	5.00	6.03	7.06	3
Great Lakes	Illinois	4.75	5.59	6.24	12
	Indiana	4.20	5.05	5.86	22
	Michigan	4.11	4.97	5.88	21
	Ohio	4.34	5.33	6.13	15
	Wisconsin	4.47	5.44	6.07	18
Plains	Iowa	4.25	5.32	5.68	32
	Kansas	4.31	5.55	5.59	37
	Minnesota	4.11	5.19	5.72	27
	Missouri	4.31	5.60	6.12	16
	Nebraska	4.45	5.44	5.69	30
	North Dakota	4.20	5.54	5.35	40
	South Dakota	4.01	5.15	5.34	42
Southeast	Alabama	4.16	5.13	5.66	34
	Arkansas	4.16	5.01	5.41	38
	Florida	4.72	6.28	6.87	5
	Georgia	4.09	5.00	5.63	35
	Kentucky	4.54	5.38	5.75	26
	Louisiana	4.33	5.17	5.34	41
	Mississippi	3.86	5.20	5.14	44
	North Carolina	4.24	5.04	6.15	14
	South Carolina	3.96	4.94	5.68	33
	Tennessee	4.37	5.23	5.94	20
	Virginia	4.29	5.16	6.19	13
	West Virginia	4.35	5.00	5.62	36
Southwest	Arizona	4.15	5.18	5.70	29
	New Mexico	3.66	4.65	5.01	45
	Oklahoma	4.14	5.09	5.39	39
	Texas	4.01	4.83	4.98	46
Rocky Mountain	Colorado	4.02	5.18	5.68	31
	Idaho	3.93	4.60	4.60	48
	Montana	3.97	4.99	5.18	43
	Utah	3.46	4.25	3.87	50
	Wyoming	3.81	4.74	4.49	49
Far West	Alaska	3.85	4.50	4.79	47
	California	4.29	5.65	5.95	19
	Hawaii	4.16	5.63	6.49	10
	Nevada	3.88	5.18	6.10	17
	Oregon	4.31	5.52	5.85	23
	Washington	4.07	5.22	5.77	25

NOTE: The 1992 population-to-enrollment ratios in this table differ slightly from the population-to-pupil ratios in Table 8. Because of data constraints, fall enrollment data were used to create the ratios in this table, while average daily attendance data were used to create the ratios in Table 8.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994* (NCES 94-115), reported in Steven D. Gold et al. "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995, and calculations by The Finance Project.

Table 5 -Real per capita income, by region: 1969, 1979, and 1991

Region	State	Per Capita Income (in 1991 dollars)			Percentage Change		
		1969	1979	1991	1969–79	1979–91	1969–91
United States		$12,636	$16,485	$19,199	30.5	16.5	51.9
New England	Connecticut	15,960	19,619	25,844	22.9	31.7	61.9
	Maine	10,370	13,394	17,330	29.2	29.4	67.1
	Massachusetts	14,075	17,273	22,796	22.7	32.0	62.0
	New Hampshire	12,398	15,880	20,961	28.1	32.0	69.1
	Rhode Island	12,640	15,476	19,451	22.4	25.7	53.9
	Vermont	11,178	14,133	17,811	26.4	26.0	59.3
Mid-Atlantic	Delaware	14,648	16,809	20,317	14.8	20.9	38.7
	Maryland	13,780	17,670	22,483	28.2	27.2	63.2
	New Jersey	14,923	18,890	24,744	26.6	31.0	65.8
	New York	15,235	17,820	22,925	17.0	28.6	50.6
	Pennsylvania	12,570	16,498	19,638	31.2	19.0	56.2
Great Lakes	Illinois	14,390	18,425	20,622	28.0	11.9	43.3
	Indiana	12,189	15,776	17,275	29.4	9.5	41.7
	Michigan	13,445	17,427	18,693	29.6	7.3	39.0
	Ohio	12,872	16,343	18,001	27.0	10.1	39.8
	Wisconsin	12,179	16,416	17,970	34.8	9.5	47.5
Plains	Iowa	11,901	16,169	17,102	35.9	5.8	43.7
	Kansas	11,636	16,571	18,259	42.4	10.2	56.9
	Minnesota	12,365	16,683	19,289	34.9	15.6	56.0
	Missouri	11,715	15,712	18,105	34.1	15.2	54.5
	Nebraska	11,725	15,661	18,047	33.6	15.2	53.9
	North Dakota	9,876	14,677	15,594	48.6	6.2	57.9
	South Dakota	9,747	14,206	16,419	45.7	15.6	68.5
Southeast	Alabama	9,024	12,814	15,601	42.0	21.7	72.9
	Arkansas	8,617	12,637	14,458	46.7	14.4	67.8
	Florida	12,007	15,857	19,203	32.1	21.1	59.9
	Georgia	10,439	13,920	17,636	33.3	26.7	68.9
	Kentucky	9,700	13,522	15,442	39.4	14.2	59.2
	Louisiana	9,521	14,010	15,067	47.1	7.5	58.2
	Mississippi	7,841	11,644	13,210	48.5	13.4	68.5
	North Carolina	9,962	13,293	16,810	33.4	26.5	68.7
	South Carolina	9,216	12,509	15,469	35.7	23.7	67.8
	Tennessee	9,720	13,447	16,489	38.3	22.6	69.6
	Virginia	11,669	15,959	20,074	36.8	25.8	72.0
	West Virginia	9,167	13,299	14,665	45.1	10.3	60.0
Southwest	Arizona	11,390	15,235	16,760	33.8	10.0	47.1
	New Mexico	9,571	13,542	14,818	41.5	9.4	54.8
	Oklahoma	10,482	15,083	15,656	43.9	3.8	49.4
	Texas	11,129	16,118	17,440	44.8	8.2	56.7
Rocky Mountain	Colorado	12,182	17,191	19,745	41.1	14.9	62.1
	Idaho	10,578	14,014	15,854	32.5	13.1	49.9
	Montana	10,631	14,558	15,793	36.9	8.5	48.5
	Utah	10,022	13,452	14,737	34.2	9.5	47.1
	Wyoming	11,682	18,612	18,295	59.3	-1.7	56.6
Far West	Alaska	15,371	22,665	21,592	47.5	-4.7	40.5
	California	14,887	19,241	20,880	29.2	8.5	40.3
	Hawaii	14,698	17,486	21,621	19.0	23.7	47.1
	Nevada	14,840	19,263	20,774	29.8	7.8	40.0
	Oregon	12,100	16,723	17,789	38.2	6.4	47.0
	Washington	13,475	17,890	20,163	32.8	12.7	49.6

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, State Summary Tables (August 1994) (SA1-3, SA51-52), 1929–93, 1948–93 and calculations by The Finance Project.

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A state that devotes a larger share of its available resources to education will spend more per-pupil than a comparable state (in terms of both demographic and fiscal capacity) that makes a more modest resource commitment.

Educational effort is really a function of two components. One is the *size* of the government sector in the state relative to overall available resources. A larger government revenue base means more resources potentially available to support educational expenditures.

The second critical component of educational effort is the *share* of government resources supporting education. Differences among states in the education share of the government pie, as well as changes in that share over time, can profoundly affect educational effort levels and, ultimately, per-pupil expenditures.

Nationally, educational effort remained relatively stable between 1970 and 1992. It declined a bit in the 1970s, before growing modestly from 1980 to 1992 (see table 6). Analyzing educational effort by its two core components reveals that the small overall decrease in education effort is entirely attributable to smaller education shares of state and local tax bases. General state and local government tax effort levels remained relatively unchanged between 1970 and 1992. However, the share of this resource base going to education declined from approximately 44 percent to 38 percent (see table 6). Most of this decline occurred in the 1970s and was a function of reduced local (rather than state) government education revenue shares.

The overall stability in educational effort should not obscure significant changes in some states in recent years (see table 7). Massachusetts, for example, increased its effort by nearly 30 percent in the 1970s, only to decrease it by about 25 percent during the 1980s and early 1990s. Wyoming did the opposite, decreasing its effort significantly in the 1970s (18 percent) and increasing it by an even greater rate (33 percent) between 1980 and 1992. Over the entire 1970 to 1992 period, 14 states experienced double-digit decreases in educational effort, while 7 experienced double-digit gains. Significantly, educational effort is not strongly associated with region. States with high and low effort levels, and with small and large recent changes in their relative resource commitments to education, can be found in all parts of the country.

Table 6.–Growth in education spending in relation to personal income and education's share of tax revenue: 1970, 1980, and 1992

	1970	1980	1992
Current Education Spending per $100 of Personal Income	$4.46	$4.30	$4.36
State-Local Education Revenue as a Percentage of Total State-Local Tax Revenue	43.5	39.0	38.2

SOURCE: Steven D. Gold et al., "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995.

Table 7.–Current education spending per $100 of personal income, by region: 1970, 1980, and 1992

Region	State	Spending per $100 Income			Percentage Change		
		1970	1980	1992	1970–80	1980–92	1970–92
United States		$4.46	$4.30	$4.36	-3.6	1.5	-2.2
New England	Connecticut	4.07	3.69	4.31	-9.4	16.8	5.8
	Maine	5.02	4.68	5.23	-6.9	11.9	4.2
	Massachusetts	3.78	4.86	3.68	28.5	-24.2	-2.6
	New Hampshire	3.74	3.73	4.00	-0.3	7.1	6.8
	Rhode Island	4.09	4.47	4.44	9.3	-0.8	8.4
	Vermont	5.35	4.86	6.24	-9.3	28.6	16.6
Mid-Atlantic	Delaware	4.56	4.89	4.14	7.3	-15.4	-9.2
	Maryland	4.49	4.37	3.99	-2.7	-8.7	-11.1
	New Jersey	4.21	4.78	5.02	13.6	5.2	19.4
	New York	4.94	5.10	4.78	3.1	-6.2	-3.3
	Pennsylvania	4.29	4.28	4.42	-0.4	3.3	2.9
Great Lakes	Illinois	3.96	3.98	3.89	0.6	-2.2	-1.7
	Indiana	4.28	3.92	4.69	-8.4	19.8	9.7
	Michigan	5.05	5.27	5.23	4.2	-0.8	3.4
	Ohio	4.00	3.97	4.63	-0.6	16.6	15.9
	Wisconsin	4.83	4.56	5.17	-5.7	13.5	7.1
Plains	Iowa	5.23	4.60	4.94	-12.1	7.3	-5.6
	Kansas	4.62	3.90	4.46	-15.5	14.3	-3.4
	Minnesota	5.57	4.85	4.61	-13.0	-4.9	-17.2
	Missouri	3.91	3.58	3.87	-8.5	8.0	-1.2
	Nebraska	4.44	4.34	4.81	-2.3	10.9	8.4
	North Dakota	5.29	4.36	4.97	-17.5	14.0	-6.0
	South Dakota	5.57	4.45	4.50	-20.1	1.0	-19.2
Southeast	Alabama	4.51	4.23	3.86	-6.3	-8.6	-14.4
	Arkansas	4.73	4.25	4.83	-10.0	13.6	2.2
	Florida	3.99	3.37	3.65	-15.7	8.5	-8.5
	Georgia	4.18	3.92	4.11	-6.3	5.0	-1.6
	Kentucky	3.77	3.91	4.72	3.7	20.7	25.2
	Louisiana	4.84	4.11	4.99	-15.1	21.3	3.0
	Mississippi	5.00	4.73	4.49	-5.4	-5.2	-10.3
	North Carolina	4.47	4.46	4.11	-0.3	-7.9	-8.1
	South Carolina	5.15	4.72	4.66	-8.2	-1.4	-9.5
	Tennessee	4.14	3.96	3.50	-4.4	-11.5	-15.4
	Virginia	4.34	4.05	3.96	-6.7	-2.2	-8.8
	West Virginia	5.16	4.81	5.74	-6.9	19.2	11.0
Southwest	Arizona	4.72	4.32	4.14	-8.5	-4.1	-12.3
	New Mexico	6.29	5.43	5.29	-13.6	-2.7	-16.0
	Oklahoma	4.23	4.31	4.58	1.9	6.2	8.2
	Texas	4.09	4.08	4.86	-0.3	19.1	18.7
Rocky Mountain	Colorado	4.64	4.64	4.14	0.1	-10.8	-10.7
	Idaho	4.57	4.39	4.62	-3.9	5.3	1.2
	Montana	5.71	5.70	6.01	-0.2	5.5	5.2
	Utah	5.68	4.97	4.98	-12.5	0.1	-12.4
	Wyoming	6.00	4.91	6.52	-18.1	32.6	8.6
Far West	Alaska	5.93	7.64	7.59	28.9	-0.7	28.0
	California	4.33	3.75	3.73	-13.4	-0.4	13.8
	Hawaii	4.29	3.87	3.60	-9.7	-6.9	-16.0
	Nevada	4.06	3.50	3.60	-13.9	2.9	-11.4
	Oregon	5.36	4.78	5.06	-10.9	5.9	-5.7
	Washington	5.15	4.65	4.21	-9.7	-9.4	-18.2

SOURCE: Education Expenditure Data—U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*; Personal Income Data—U.S. Department of Commerce as of August 1994, reported in Steven D. Gold et al. "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May 1995.

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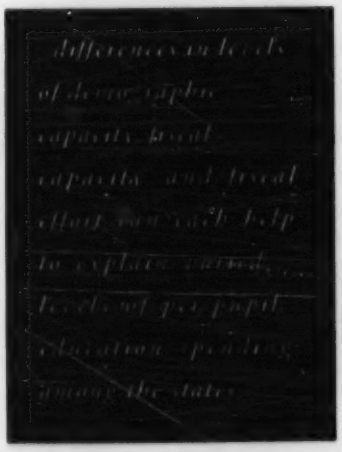
Examining Interstate Spending Differences

As just discussed, differences in levels of demographic capacity, fiscal capacity, and fiscal effort can each help to explain varied levels of per-pupil education spending among the states. But are there patterns in the relative influences of these factors that can be useful in projecting the challenges ahead in education spending? Using the identity developed by Gold (see Section 2: Approach to the Issues), we examine the relative contribution of each in determining per-pupil expenditure levels.

Table 8 arrays states by their 1992 per-pupil spending levels, alongside measures of demographic capacity (the ratio of population to number of pupils), fiscal capacity (per capita income), and education effort (education spending per $100 of personal income). The data are indexed to the national average to facilitate comparisons. A few things are noteworthy about these findings. First of all, as Gold points out, there are few common patterns among the highest-spending states; different factors are associated with high education expenditures in different places. In Connecticut, bountiful tax capacity is the primary story (35 percent above the national average). Educational effort levels here are only about average. Vermont's high spending is completely attributable to its unusually high educational effort rates (it devotes nearly half of its tax revenues to education spending, the fifth highest rate in the country). By contrast, high incomes and favorable population/pupil ratios allow neighboring Massachusetts to spend generously with educational effort levels that are only 85 percent of the national average.



The picture is much simpler in the lowest-spending states. As Gold also notes, virtually every one of the lowest-spending states has both low per capita income and a low demographic capacity. Significantly, most of the low-spending states (located primarily in the South) are making at least average levels of educational effort. However, the combination of a weak fiscal resource base and the need to support relatively large numbers of children results in low per-child service levels.

To summarize, high state per-pupil spending seems related to relatively unique combinations of demographic capacity, fiscal capacity, and fiscal effort. On the other hand, low spending is consistently explained in terms of low demographic and/or fiscal capacity.

Implications for the Future

The salience of income and demographic factors in explaining per-pupil spending patterns and trends has two significant implications for education spending over the next decade. First, it is clear that more modest income growth and sharply increasing enrollments in most states mean that they will not witness growth rates in per-pupil education spending that were commonplace during the 1970s and 1980s. As illustrated in Figure 1, school enrollment is projected to increase substantially through the year 2005, in sharp contrast to the declines that occurred in the 1970s and early 1980s. At the same time, growth in per capita income is projected through 2005 to be slower than the growth trends the nation has experienced in each half-decade since 1970, with the exception of the 1990–94 period. It appears that recent income and enrollment changes have already contributed to dramatic slowdowns in per-pupil spending growth during the early 1990s. The future outlook for these variables likely will further dampen per-pupil spending gains through the year 2005. Further, these projections do not take into account the looming cutbacks in federal aid outside the education arena. These are likely to exacerbate fiscal pressures on the

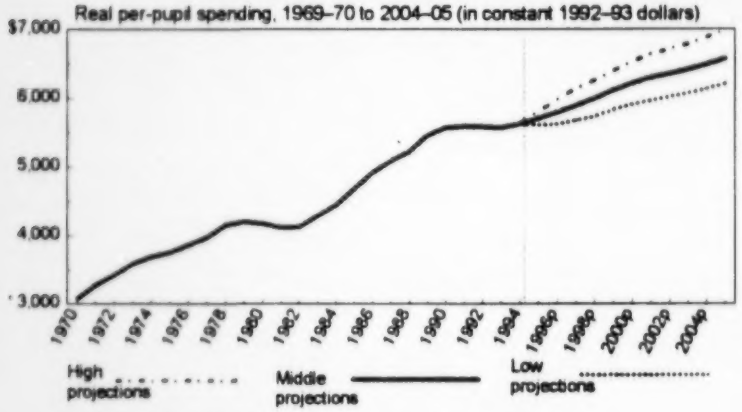
Table 8.–Determinants of education spending per pupil relative to the U.S. average, by region: 1992

Region	State	Education spending per pupil	Index (U.S.=100)	Ratio of pop. to pupils	Index (U.S.=100)	Per capita income	Index (U.S.=100)	Education spending per $100 pers. inc.	Index (U.S.=100)
New England	Connecticut	$8,017	148	7.19	111	$25,844	135	$4.31	99
	Maine	5,652	104	6.23	96	17,330	90	5.23	120
	Massachusetts	6,408	118	7.63	118	22,796	119	3.68	85
	New Hampshire	5,790	107	6.92	107	20,961	109	4.00	92
	Rhode Island	6,546	121	7.59	117	19,451	101	4.44	102
	Vermont	6,944	128	6.25	97	17,811	93	6.24	143
Mid-Atlantic	Delaware	6,093	112	7.25	112	20,317	106	4.14	95
	Maryland	6,679	123	7.44	115	22,483	117	3.99	92
	New Jersey	9,317	172	7.50	116	24,744	129	5.02	115
	New York	8,527	157	7.79	121	22,925	119	4.78	110
	Pennsylvania	6,613	122	7.62	118	19,638	102	4.42	101
Great Lakes	Illinois	5,670	105	7.07	109	20,622	107	3.89	89
	Indiana	5,074	94	6.26	97	17,275	90	4.69	108
	Michigan	6,268	116	6.42	99	18,693	97	5.23	120
	Ohio	5,694	105	6.83	106	18,001	94	4.63	106
	Wisconsin	6,139	113	6.61	102	17,970	94	5.17	119
Plains	Iowa	5,096	94	6.04	93	17,102	89	4.94	113
	Kansas	5,007	92	6.15	95	18,259	95	4.46	102
	Minnesota	5,409	100	6.08	94	19,289	100	4.61	106
	Missouri	4,830	89	6.89	107	18,105	94	3.87	89
	Nebraska	5,263	97	6.06	94	18,047	94	4.81	110
	North Dakota	4,441	82	5.72	89	15,594	81	4.97	114
	South Dakota	4,173	77	5.65	87	16,419	86	4.50	103
Southeast	Alabama	3,616	67	5.95	92	15,601	81	3.86	89
	Arkansas	4,031	74	5.77	89	14,458	75	4.83	111
	Florida	5,243	97	7.47	116	19,203	100	3.65	84
	Georgia	4,375	81	6.03	93	17,636	92	4.11	94
	Kentucky	4,719	87	6.47	100	15,442	80	4.72	108
	Louisiana	4,354	80	5.79	90	15,067	78	4.99	114
	Mississippi	3,245	60	5.48	85	13,210	69	4.49	103
	North Carolina	4,555	84	6.60	102	16,810	88	4.11	94
	South Carolina	4,436	82	6.16	95	15,469	81	4.66	107
	Tennessee	3,692	68	6.39	99	16,489	86	3.50	80
	Virginia	4,880	90	6.14	95	20,074	105	3.96	91
	West Virginia	5,109	94	6.07	94	14,665	76	5.74	132
Southwest	Arizona	4,381	81	6.31	98	16,760	87	4.14	95
	New Mexico	3,765	69	4.80	74	14,818	77	5.29	121
	Oklahoma	4,078	75	5.69	88	15,656	82	4.58	105
	Texas	4,632	85	5.46	85	17,440	91	4.86	111
Rocky Mountain	Colorado	5,172	95	6.33	98	19,745	103	4.14	95
	Idaho	3,556	66	4.86	75	15,854	83	4.62	106
	Montana	5,423	100	5.71	88	15,793	82	6.01	138
	Utah	3,040	56	4.14	64	14,737	77	4.98	114
	Wyoming	5,812	107	4.88	76	18,295	95	6.52	149
Far West	Alaska	8,450	156	5.16	80	21,592	112	7.59	174
	California	4,746	88	6.09	94	20,880	109	3.73	86
	Hawaii	5,420	100	6.95	108	21,621	113	3.60	83
	Nevada	4,926	91	6.59	102	20,774	108	3.60	83
	Oregon	5,913	109	6.57	102	17,789	93	5.06	116
	Washington	5,271	97	6.21	96	20,163	105	4.21	97

NOTE: The population-to-pupil ratios in this table differ slightly from the 1992 population-to-enrollment ratios in Table 4. Because of data constraints—primarily the need to use a consistent measure of pupils in the two variables of spending per pupil and the ratio of population to pupils for this identity—average daily attendance data were used to create the population-to-pupil ratios in this table, while fall enrollment data were used to create the ratios in Table 4.

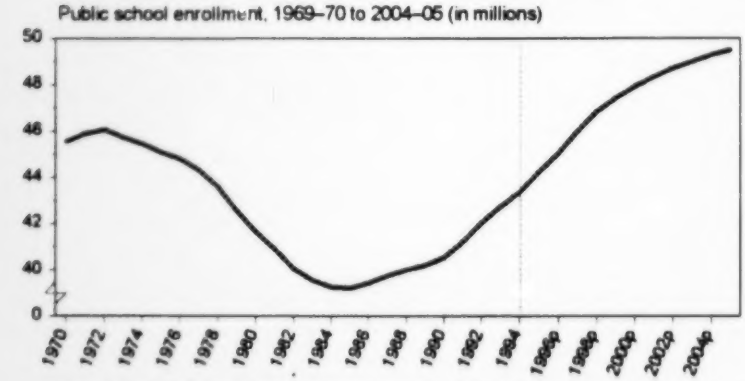
SOURCE: Steven D. Gold et al., "How Funding of Programs for Children Varies Among the 50 States," prepared for The Finance Project, May, 1995.

Figure 1.—Recent and projected trends in spending, enrollment, and income, 1970–2005



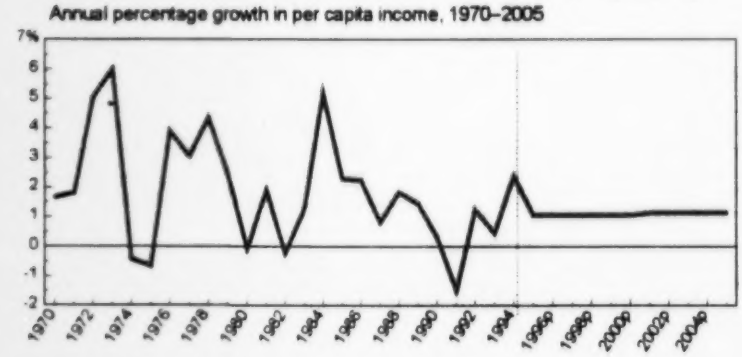
Change in real per-pupil spending (in constant 1992–93 dollars)

1970–74	$612
1975–79	$439
1980–84	$271
1985–89	$781
1990–94	$61
1995–99p	?
2000–05p	?



Change in public school enrollment (in thousands)

1970–74	-106
1975–79	-2,522
1980–84	-2,399
1985–89	981
1990–94	2,810
1995–99p	3,176
2000–05p	1,579



5-year average rates of growth in per capita income

1970–74	3.1%
1975–79	2.6%
1980–84	1.6%
1985–89	1.7%
1990–94	0.6%
1995–99p	1.1%
2000–05p	1.1%

p = projected

SOURCE: Real per-pupil spending and public school enrollment–U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*, and *Projections of Education Statistics to 2005*; per capita income growth–U.S. Department of Commerce, Bureau of Economic Analysis; historical data and projections for 2000 and 2005 contained in *Survey of Current Business*, July 1995; and calculations by The Finance Project.

education sector as competition for available state and local dollars becomes more intense. It may, in fact, be difficult for overall educational effort levels to remain stable in the coming decade in the face of such competition.

Second, it is extremely unlikely that disparities among states in their spending levels will be greatly reduced in the years ahead. Projections for income growth in the lowest-spending states are comparable, by and large, to those of the highest-spending states. Although a few of the lowest-spending states like Louisiana, Mississippi, and North and South Dakota are projected to experience relatively small increases in enrollment growth, they are also among the states that are most dependent on federal aid and thus most likely to be affected by grant-in-aid cutbacks. Of the 10 highest-spending states, only 3 (Alaska, Maryland, and New Jersey) have higher-than-average projected enrollment growth through the year 2005.

Summary and Conclusions

Our primary purpose in studying state spending patterns and trends in education is to permit us to make more informed judgments about future state financial investments in this area. We employed a three-factor model consisting of measures of service needs (demographic capacity), ability to pay (fiscal capacity), and willingness to pay (fiscal effort), in an attempt to associate each of these with state per-pupil spending levels for education.

Two of the three factors—service needs and ability to pay—demonstrated a consistently strong relationship to state education spending per-pupil. States with larger proportions of children who need services (the school-age population) consistently were less likely to spend as much on a per-child basis as states with lower levels of overall need. Similarly, high-income states spent considerably more per child on education than did poorer states. By contrast, the association between fiscal effort and state spending was relatively weak. Many low-spending states made large resource commitments to education relative to their income, while several high-spending states made a more modest education effort. It is the strong and consistent relationship between service needs, ability to pay, and state education spending which, when placed in the context of demographic and economic projections, leads to concerns about future state educational spending. Factors associated with substantially higher spending levels in most states—in particular, healthy per capita income growth and declining school enrollments—are not likely to be present over the coming decade. Public school enrollments are expected to rise at a rate of about 1 percent per year between now and 2005. If more modest per capita income growth projections prove accurate, most states will be extremely hard pressed to maintain their education spending patterns of recent years.[10]

the strong and consistent relationship between service needs, ability to pay, and state education spending, when placed in the context of demographic and economic projections, leads to concerns about future state educational spending

The effects of cutbacks in federal aid to states and localities in order to achieve a balanced federal budget can be expected to further exacerbate the fiscal stresses on states stemming from less favorable demographic and economic conditions. Federal aid currently augments state and local tax revenues by about one-third. Thus, major reductions will undoubtedly put additional pressure on states to make up shortfalls in a variety of areas (e.g., transportation, higher education, community development) by raising their own spending levels. Because tax increases are unlikely and economic growth is expected to be modest, the revenue to fund any such

[10] Some have pointed out that in addition to expected lower income growth rates, the increasing percentage of economic activity not subject to taxation will further handicap future state and local revenue-raising capacities.

increases may well come from reallocating existing resources. The education sector may become especially vulnerable, since it is the largest single functional component of state and local budgets, comprising 38 cents of every state and local tax dollar in 1992.

In conclusion, the salience of indicators of service needs and ability to pay in explaining state investment levels in education leads to the conclusion that most states will be greatly challenged in the years ahead in financing these programs. The extent of the financing challenge will vary considerably by state, but, in general, a combination of increased needs, slower growth in fiscal capacity, and reduced federal aid will make it extremely unlikely that the vast majority of states can sustain the per-pupil spending patterns of the previous two decades.

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The Growth of Education Revenues Between 1982–83 to 1991–92: What Accounts for Differences Among States?

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Public elementary and secondary schools have experienced a tumultuous period since 1983, when *A Nation at Risk* was published. In response to legal challenges and criticisms raised by that report, states embarked on a substantial effort to improve their schools. This study focuses on one aspect of how states responded to the demand for better education systems: How much additional money was raised for schools? This focus does not imply that money is more important than the operation of schools. However, many studies have focused on the non-monetary aspects of school improvement efforts over the last decade, with relatively little research being devoted to school finances. This study examines revenue for schools that is provided by state and local governments, and which accounts for approximately 93 percent of total education revenue. It does not consider federal aid, which contributes approximately 7 percent.

NOTE: This research is a modification and extension of article: *The Growth of School Spending During the Past Decade: What Accounts for Differences Among States?* which was a preliminary examination of three major factors independently influencing education revenues. This research also analyzes how these influences jointly affect the level of revenue increases from 1982–83 to 1991–92.

Overview

Between school year 1982–83 to school year 1991–92, state and local education revenues increased 96 percent. Most of this increase was due to inflation. After removing the effects of price increases, education revenues rose 39.1 percent.[1] On a per-pupil basis, revenues increased 27.8 percent in real terms.

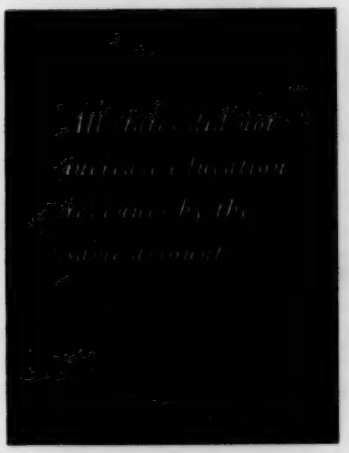
[1] Inflation was measured by the Consumer Price Index (CPI), which rose 41 percent between school year 1982–83 to school year 1991–92. The CPI was chosen to facilitate comparisons with other recent studies; inflation, according to the implicit deflator for state and local governments, was slightly lower (40.5 percent).

All states did not increase education revenues by the same amount. In fact, in seven states real per-pupil revenue rose more than 50 percent, while it fell in eight states.[2] The main objective of this paper is to analyze some of the most important factors related to the following differences:

- Did states with relatively large enrollment increases tend to have less growth of per-pupil revenue? It is much easier to increase revenues per-pupil when enrollment does not grow continuously.

- How much, if at all, did levels of revenue per-pupil tend to converge? Did states that had relatively low per-pupil revenues in school year 1982–83 tend to have larger than average revenue increases?

- How much effect did economic growth have on increases in per-pupil education revenues? If personal income grows more rapidly, that tends to make state and local tax revenue increase faster, permitting higher increases in school revenue.



- What was the contribution of revenues from different governmental levels to changes in education revenues? Did states with the largest revenue increases rely primarily on state government, or did local government also make a significant contribution?

[2] The seven states with per-pupil revenue increases greater than 50 percent were: Arkansas, Connecticut, Kentucky, Louisiana, New Jersey, North Carolina, and West Virginia. The eight states that had declines in per-pupil revenue were Alaska, Colorado, Montana, New Mexico, North Dakota, Oklahoma, Utah, and Wyoming.

Description of the Data Used in this Analysis

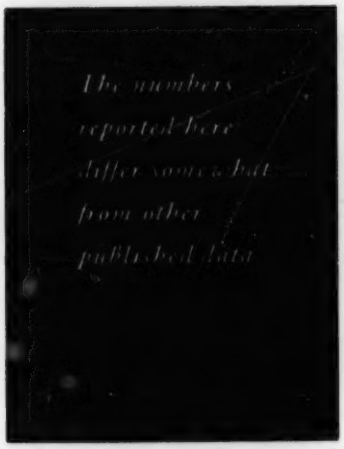
The data used in this analysis come from the National Center for Education Statistics (NCES) Common Core of Data (CCD) collection of public education revenues for the years 1982–83 through 1991–92. CCD is an annual collection of basic information on the population of public elementary and secondary schools in the United States derived from the administrative and fiscal records of state departments of education. Each year, states report to NCES the revenues their local education agencies receive from local, intermediate, state, and federal sources. As indicated, this analysis focuses only on state and local government education revenues.

These data have both advantages and disadvantages. A major advantage is that the information is subject to rigorous scrutiny by NCES and therefore, are highly reliable. However, the reliability of the data comes at a cost. CCD data tend to be less current than data from other sources. Another shortcoming of the data is their imputations of state contributions to teacher pensions, which are a major source of state support for education.

We adjusted the CCD state and local revenue data for years 1982–83 through 1991–92 in two ways to facilitate analysis. First, we divided the reported revenue aggregates by a measure of state student populations (1) to permit comparisons of different size states and (2) to control for fluctuations in enrollment size when measuring revenue change over time. Previous studies from the Bureau of the Census and the Council of Chief State School Officers (CCSSO), have noted variation in how states calculate and report average daily attendance (ADA). Consequently, this analysis uses NCES' annual enrollment figures by state as the student population measure.

Second, we adjusted the nominal figures reported by the state using the CPI index to permit analysis in constant 1991–92 dollars.[3]

This study relies heavily on work completed by Martin E. Orland, preliminary research done by Gold and Alexander, as well as a recent report produced by John Augenblick et al. for the Education Commission of the States. As with the present study, Orland also uses NCES data, but he adjusts them in an unconventional way. Instead of using a single national price adjustor, Orland made adjustments individually for each state using a two-step procedure. First, he adjusted for the varied rates of wage and salary change occurring in the different states. He used the average wage data of each state to convert 77.4 percent of the reported public education revenues—the percentage representing the proportion of education costs going to wages and salaries in 1985–86. Second, he adjusted for inflationary price increases in areas other than wages and salaries by converting the remaining 22.6 percent of state education revenues with a national constant price adjustor.



Both Gold et al. and Augenblick used expenditure data reported by the National Education Association (NEA). Augenblick's analysis adjusts these data in two ways. The first method is a more conventional adjustment; it involves deflating revenue to eliminate the effects of inflation. The second method attempts to account for differences among states in the cost of education. For this purpose, Augenblick used an index developed by Howard Nelson of the American Federation of Teachers (AFT). The Nelson index estimated, for example, that the price level in Alabama was 10 percent below the national average; therefore, to make its spending per-pupil comparable to that in other states, Augenblick multiplied the state's actual spending per-pupil by 1.11. On the other hand, Connecticut's price level was estimated to be 27 percent above average, so its spending per-pupil was multiplied by 0.79.

The Nelson (and other cost-of-living) adjustments are irrelevant for most of the questions discussed in this analysis because they do not affect the percentage increase in per-pupil revenues. The adjustments do, however, affect consideration of the relationship between the level of revenue in 1982–83 and increases that occurred during the next 9 years. Table 1 shows the adjusted and unadjusted levels of per-pupil revenues in 1982–83. One of the biggest differences is in Connecticut, which ranked fifth in unadjusted revenues but ranked only 26th based on the Nelson index. Hawaii, Massachusetts, New Jersey, and Rhode Island had a ranking that was at least 10 places lower after revenue was adjusted. There are no states with large pre- and post-adjustment differences that had higher rankings using the Nelson adjustments.

The numbers reported here differ somewhat from other published data on this topic (e.g., NCES, 1988; and Education Commission of the States, 1993). The source of these differences will vary by study, but are generally caused by one or more of the following factors:

- using expenditure data rather than the revenue information employed in this study;
- comparing revenue trends for different years;
- using a different price adjustor;

[3] Many economists, including Alan Greenspan, chairman of the Federal Reserve, think that the CPI generally overstates the level of inflation that exists in an economy. Greenspan estimates that this exaggeration is anywhere between one-half and one and one-half percent. If this is true, then the real growth of per-pupil revenue and personal income per-pupil are consistently underestimated in this study.

Table 1.—Real per-pupil education revenues actual and adjusted for differences in price levels among states, 1982–83

State	Unadjusted Per-pupil revenues	Unadjusted Rank	Adjusted Per-pupil revenues	Adjusted Rank	Difference in dollars Unadj.-Adj.	Change in rank Unadj.-Adj.
National average	$3,896		$3,896			
Connecticut	4,828	5	3,793	29	$1,035	-24
Hawaii	3,806	25	2,997	43	809	-18
Massachusetts	4,779	7	3,775	30	1,004	-23
New Jersey	5,497	4	4,251	19	1,246	-15
Rhode Island	4,543	10	4,111	21	432	-11

NOTE: Price level adjustment is based on index developed by Howard Nelson, 1989.

SOURCE: F. Howard Nelson. "An interstate cost-of-living index." Evaluation and Policy 13: 103–111. (Table 1-6).

- using a different population measure; and
- using data as reported by the National Education Association (NEA) rather than data reported by NCES.

Revenue Increases and Changes of Enrollment

Table 2 shows the growth of inflation-adjusted education revenues. Three measures have to be considered to obtain a complete picture of how education revenues increased: total and per-pupil revenues and changes in enrollment. In West Virginia, for example, total education revenues rose considerably slower than average, but per-pupil revenues rose 51.8 percent, the seventh fastest increase in the nation. This is because West Virginia's enrollment actually fell 14.3 percent, the biggest decline in the United States. Consequently, though the growth of total revenues in West Virginia lagged behind the national average, this was more than offset by the substantial decrease in enrollment. On the other hand, Florida had below average per-pupil revenue increases. The fact that enrollment rose 32.5 percent in this state—the third highest in the nation—made it difficult for Florida to increase its per-pupil revenues. The states with the biggest increases in revenue per-pupil were Arkansas, Kentucky, Maine, New Jersey, and North Carolina. The states with the smallest increases were Colorado, New Mexico, North Dakota, Utah, and Wyoming.

Enrollment rose in 41 states and fell in 9 states between school years 1982–83 and 1991–92. The biggest increases in enrollment were in Nevada (48.2 percent), Arizona (32.9 percent), Florida (32.5 percent), California (27.1 percent), and Alaska (24.7 percent). The largest decreases in enrollment were in West Virginia (-14.3 percent), Indiana (-2.4 percent), Massachusetts (-2.2 percent), Michigan (-2.0 percent), and Ohio (-1.7 percent).

Table 3 examines the relationship between increases in revenue per-pupil and enrollment growth. In 20 states the trade-off between enrollment increases and revenue growth was particularly marked. Eleven of these states had high enrollment increases and low revenue growth; nine states had declines or low growth of enrollment and high revenue increases.

Table 2.—Growth of inflation-adjusted education revenues, total and per-pupil, 1982–83 to 1991–92

State	Total revenues	Rank	Per-pupil revenues	Rank	Enrollment	Rank
National average	39.12		27.78		8.87	
Alabama	19.93	38	19.68	33	0.21	41
Alaska	22.63	36	-1.68	45	24.72	5
Arizona	79.82	2	35.28	13	32.92	2
Arkansas	59.49	9	56.10	4	2.17	34
California	70.39	4	34.10	16	27.07	4
Colorado	10.29	44	-2.39	46	12.99	14
Connecticut	58.17	11	54.65	6	2.28	32
Delaware	30.43	29	14.29	36	14.13	11
Florida	68.76	5	27.38	27	32.49	3
Georgia	44.27	18	25.59	30	14.88	10
Hawaii	47.11	15	34.50	15	9.37	19
Idaho	46.37	16	30.37	20	12.27	16
Illinois	34.26	26	32.81	18	1.09	37
Indiana	40.41	21	43.88	11	-2.41	49
Iowa	7.12	46	7.65	40	-0.49	43
Kansas	18.97	40	6.77	41	11.43	17
Kentucky	65.62	6	63.69	1	1.18	36
Louisiana	7.69	45	7.99	39	-0.28	42
Maine	63.22	7	58.17	3	3.19	30
Maryland	47.27	14	33.88	17	10.00	18
Massachusetts	24.08	35	26.81	29	-2.15	48
Michigan	20.46	37	22.89	32	-1.98	47
Minnesota	32.65	28	17.86	34	12.55	15
Mississippi	40.93	20	30.10	21	8.32	22
Missouri	39.53	22	29.15	24	8.03	23
Montana	2.88	47	-1.21	43	4.14	29
Nebraska	19.84	39	13.28	38	5.80	26
Nevada	107.27	1	39.84	12	48.21	1
New Hampshire	70.70	3	49.77	8	13.97	13
New Jersey	56.75	12	59.15	2	-1.51	45
New Mexico	13.10	43	-3.37	47	17.04	9
New York	30.32	30	29.60	23	0.56	40
North Carolina	58.53	10	55.05	5	2.25	33
North Dakota	-8.21	49	-9.39	49	1.30	35
Ohio	27.71	33	29.91	22	-1.69	46
Oklahoma	-0.30	48	-1.26	44	0.97	39
Oregon	30.31	31	14.21	37	14.09	12
Pennsylvania	27.37	34	28.88	25	-1.17	44
Rhode Island	34.18	27	27.29	28	5.41	27
South Carolina	51.52	13	44.61	10	4.77	28
South Dakota	14.04	42	4.28	42	9.36	20
Tennessee	34.81	25	31.05	19	2.87	31
Texas	45.52	17	23.05	31	18.26	8
Utah	16.78	41	-4.79	48	22.65	6
Vermont	62.11	8	48.72	9	9.01	21
Virginia	43.69	19	34.52	14	6.81	25
Washington	39.16	23	14.29	35	21.76	7
West Virginia	30.19	32	51.85	7	-14.26	50
Wisconsin	37.99	24	28.88	26	7.07	24
Wyoming	-28.00	50	-28.76	50	1.07	38

SOURCE: U.S. Department of Education, National Center for Education Statistics. *Digest of Education Statistics.*

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Table 3.—Highlights of inflation-adjusted per-pupil education revenues and change of enrollment, 1982–83 to 1991–92

High increase in per-pupil revenue and decrease or small increase in enrollment (9 states)

Arkansas	Connecticut	Illinois
Indiana	Kentucky	New Jersey
North Carolina	Tennessee	West Virginia

Low increase in per-pupil revenue and high increase in enrollment (11 states)

Alaska	Colorado	Delaware	Kansas
Minnesota	New Mexico	Oregon	South Dakota
Texas	Utah	Washington	

High per-pupil revenue increase despite high enrollment increase (7 states)

Arizona	California	Hawaii
Idaho	Maryland	Nevada
New Hampshire		

Low per-pupil revenue increase despite enrollment decrease or small increase (7 states)

Alabama	Iowa	Louisiana
Michigan	North Dakota	Oklahoma
Wyoming		

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*.

The seven states with low increases in revenue despite decreases or small increases in enrollment had economies dependent on oil production, automobile manufacturing, agriculture, or industries that were depressed throughout much of the period.

Convergence of Revenue Levels

Intergovernmental competition tends to even out differences in education revenue among states. Because employers seek well-trained workers, states that have relatively weak school systems are at a significant disadvantage in attracting investment that is crucial to a prosperous economy. As a result, it would be expected that states with relatively low per-pupil revenue in 1982–83 would tend to have faster than average revenue increases over the next nine years. Moreover, because of fiscal pressures and a higher initial base, it would be expected that those states with relatively high per-pupil revenues in 1982–83 would have lower than average revenue increases over the same period.

The convergence hypothesis can be tested in two ways, using actual per-pupil revenues in 1982–83 or using a measure of revenue that is adjusted for

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differences in costs. Table 4 examines the relationship between 1982–83 revenues and subsequent revenue growth using revenue adjusted only for inflation. In general, table 4 supports the hypothesis that a "catch up" phenomenon occurred. Some distinct regional tendencies are apparent. Of the 12 states with relatively low education revenues in 1982–83 and subsequent large increases over the next nine years, 11 are in the Southeast or Western quadrant of the country. By contrast, all four states with large increases in per-pupil revenues despite already having high revenue in 1982–83 are in the Northeast.

Economic Growth and Revenue Increases

The growth of state and local education revenues depends heavily on the health of a state's economy. It would be expected that states with strong economies would provide larger increases in per-pupil revenues. In the United States, indicators of state fiscal capacity are often grounded in measures of personal income. A limitation of these measures is their inability to reflect the diversity of tax and revenue sources, as well as their failure to capture the ability of states to export taxes.[4] Notwithstanding these shortcomings, measures of personal income are often more current and more readily available than other indicators. Further, states generally do not vary significantly in their rankings among the various fiscal capacity measures, except in the case of energy-rich and tourist-rich states.

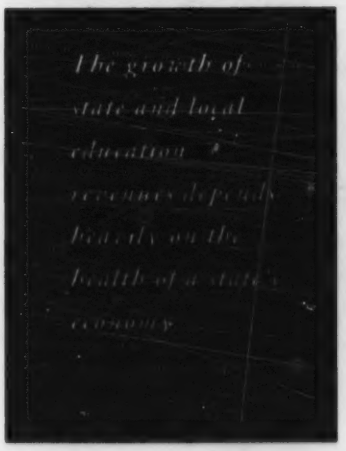

Table 5 examines the relationship between increases in personal income per-pupil and school revenue per-pupil. In general, it supports the notion that a strong economy leads to increased funding for schools. The relationship between per-pupil revenue increases and the growth of personal income per-pupil is more pronounced than the relationships described above.

State Versus Local Revenues

The final issue considered in this study is somewhat different from those discussed previously. Enrollment changes, initial revenue levels, and personal income growth all can be viewed as determinants of how much revenue increased. In this section, we consider where the money came from—was it mainly state or local governments that provided the bulk of increased funding in the states with particularly large or small revenue increases? Growth in state funding tended to outpace that provided by local governments in those states which had the smallest increases in per-pupil revenues. The opposite occurred for those states with particularly high increases.

Revenue Increases and the Joint Impact of Enrollment, 1982–83 Per-Pupil Education Revenue, and Personal Income Per-Pupil

Regression analysis[5] generally supports the model of education revenue increases postulated above. Controlling for regional variation, as well as the economic and demographic factors previously discussed, the model accounts for 63.4 percent[6] of the variation in the growth of per-pupil education revenues from 1982–83 to 1991–92. The regression

[4] For a more detailed discussion of the limitations of using personal income and possible alternatives, see ACIR. 1993. "RTS 1991: State revenue capacity and effort." Washington, DC: Government Printing Office.

[5] The report conducted the regression analysis using the Econometrics Toolkit (ET) software.

[6] The percent of variation explained by the model increases to 66.7 percent when using adjusted per-pupil education revenues (see table 6).

Table 4.—Highlights of inflation-adjusted per-pupil education revenue, 1982–83 to 1991–92, and 1982–83 revenue per-pupil

Low 1982–83 per-pupil revenue and high increase (12 states)

Arkansas	Arizona	California	Idaho
Indiana	Kentucky	Maine	Nevada
North Carolina	South Carolina	Tennessee	West Virginia

High 1982–83 per-pupil revenue and low increase (12 states)

Alaska	Colorado	Delaware	Iowa
Kansas	Mississippi	Minnesota	Montana
North Dakota	Oregon	Washington	Wyoming

Low 1982–83 per-pupil revenue and low increase (5 states)

Alabama	Louisiana
South Dakota	Utah
Texas	

High 1982–83 per-pupil revenue and high increase (4 states)

Connecticut	Maryland
Rhode Island	New Jersey

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*.

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Table 5.—Highlights of inflation-adjusted per-pupil education revenue, 1982–83 to 1991–92, and growth of real personal income per-pupil, 1982–83

High increases in personal income per-pupil and high growth in per-pupil revenue (13 states)

Arkansas	Connecticut	Indiana	Hawaii
Kentucky	Maine	Maryland	New Hampshire
New Jersey	North Carolina	South Carolina	Vermont
Virginia			

Low increases in personal income per-pupil and low growth in per-pupil revenue (12 states)

Alaska	Colorado	Kansas	Louisiana
Montana	Nebraska	New Mexico	North Dakota
Oklahoma	Oregon	Texas	Utah

Low increases in personal income per-pupil and high increases in per-pupil revenue (4 states)

Arizona	California
Idaho	Tennessee

High increases in personal income per-pupil and low increases in per-pupil revenue (2 states)

Alabama	Michigan

SOURCE: U. S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*. U.S. Department of Commerce, Bureau of Economic Analysis.

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Table 6.—Joint impact of personal income per-pupil, enrollment, and adjusted 1982–83 education revenue on the growth of per-pupil education revenue, 1982–83 to 1991–92 when controlling for regional variation

Variables	Coefficient	T-ratio
Constant	50.027	4.791
Personal income per-pupil	0.586	2.844*
Enrollment	0.078	0.377
Adjusted 1983 PPR	-0.008	-3.625*
New England	9.148	1.445
Mid Atlantic	2.698	0.374
Great Lakes	2.335	0.346
Plains	-12.668	-2.035*
Southwest	-9.522	-1.223
Rocky Mountain	-16.989	-2.258*
Far West	-1.531	-0.201
R-squared:	0.735	
Adj. R-squared:	0.666	
Degrees of freedom:	10,39	
*:	coefficient is significant at the 0.05 percent level.	

NOTE: The Southeastern states are the comparative regional base for this model. The regression results indicate, for example, that the growth of per-pupil school revenue in New England was 9.15 percentage points higher than in the Southeast, holding personal income per-pupil, enrollment, and adjusted 1982–83 per-pupil revenue constant. This result was not significant at the 0.05 percent level.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*. Washington, DC: Government Printing Office. U.S. Department of Commerce, Bureau of Economic Analysis.

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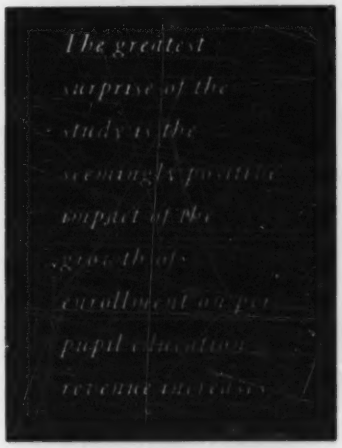
findings indicate that for each 1 percent increase in personal income per-pupil, per-pupil education revenue rises by 0.612.percent, holding all other factors constant. This estimated coefficient is significant at the 0.05 percent level.

The unadjusted 1982–83 per-pupil revenue negatively influences the subsequent growth of per-pupil school revenue from 1982–83 to 1991–92, *ceteris paribus*. For each 1 percent rise in the level of 1982–83 education revenue per enrolled student, per-pupil revenue decreases by 0.006 percent. This estimated coefficient is significant at the 0.05 percent level. The magnitude of the coefficient implies, however, that 1982–83 per-pupil education revenue does not have a substantive impact on the growth of education revenue per-pupil.

Surprisingly, the results do not reflect the expected negative effect of enrollment. Instead, they indicate that for each 1 percent increase in enrollment, education revenue per-pupil rises by 0.104 percent, all things equal. This estimated coefficient is not significant at the 0.05 percent level.



The results of the regression analysis support the suggestion that a pattern of regional variation in per-pupil revenue growth exists. In general, the states in the New England, Mid-Atlantic, Great Lakes, and Far West regions have a relatively higher growth of per-pupil education revenue than in the Southeast, all things equal. By contrast, the Plains, Southwestern, and Rocky Mountain states have a relatively lower growth of education revenue from 1982–83 to 1991–92 than the Southeast. The estimated coefficients of the Plains and Rocky Mountain regions are the only coefficients significant at the 0.05 percent level. See table 6 for a summary of these regression findings.

Conclusion

The above analyses imply that the growth of a state's economy as measured by personal income per-pupil is closely tied to per-pupil revenue increases. A clear pattern emerges where the faster the growth of a state's economy, the more likely that state is to have per-pupil education revenues rise faster than average. While this general pattern holds for most states, key exceptions do exist. In Michigan, for example, despite the relatively high growth of personal income per-pupil, this state still had fairly low growth of per-pupil education revenue between 1982–83 to 1991–92. This reflects the particularly small increase in the contribution of the state government to education during the period studied.[7]

Differences in the level of per-pupil revenues in 1982–83 also seem to play a role in the variation among states in the growth of education revenues per student. The lower the education revenue was in 1982–83, the faster it tended to increase in the subsequent nine years. Distinct regional tendencies are readily apparent in this aspect of the analysis. The four states with large increases in per-pupil revenue despite already having high education revenue in 1982–83 are all located in the Northeast.

The greatest surprise of the study is the seemingly positive impact of the growth of enrollment on per-pupil education revenue increases. The direction of the enrollment effect contrasts with previous research on the growth of education revenue, as well as the expectations of this study. This unusual finding and the insignificant estimated coefficient suggest that student population would be better captured using

[7] Michigan ranked 47th in the nation in terms of the growth of state education revenues from 1982–83 to 1991–92.

another variable, such as the annual fall membership count.

Finally, the findings seem to indicate that those states with the highest growth of per-pupil education revenues tended to rely on increases from local sources rather than on growth of state funding. By contrast, those states with particularly small increases in per-pupil education revenue tended to receive more of their additional funding from state, rather than local, governments. However, the growth of per-pupil revenue does not denote the portion of education funding by government source. Consequently, nothing can be said of the states' existing relative reliance on a particular level of government.

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Dr. Chrys Dougherty obtained his Ph.D. in economics in 1992 from Harvard University, with a research focus on economic growth in advanced industrialized countries. He teaches courses in microeconomics, econometrics, and education policy at the LBJ School of Public Affairs at the University of Texas at Austin. His current research focuses on school effectiveness, public information on school performance, and school choice; and the contribution of human and physical capital investment to economic growth.

Prior to teaching at the LBJ School, Dr. Dougherty worked as an economic consultant for Magee, Inc. In the 1970s he taught elementary school science at the Oakland Community School in Oakland, California. He has written or co-authored papers on educational accountability, school choice, and international comparisons of the sources of economic growth.

A Study of Administrative Expenditures in Texas Public Schools

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This paper reports on the results of a 1992 study of administrative expenditures in Texas public school districts in the 1990–91 school year. A research team at the LBJ School of Public Affairs at the University of Texas at Austin sought answers to the following questions:

1. What definition of "administrative expenditure" makes sense if the goal is to impose state limits on administrative expenditures by local school districts?

2. What is the relevant variable to analyze: the administrative expenditure per student, or the ratio of administrative expenditure to instructional expenditure?

3. What student or school district characteristics are associated with high administrative expenditure?

4. Is there a relationship between administrative expenditure and student learning?

5. What do districts with unusually high or low administrative expenditures do differently?

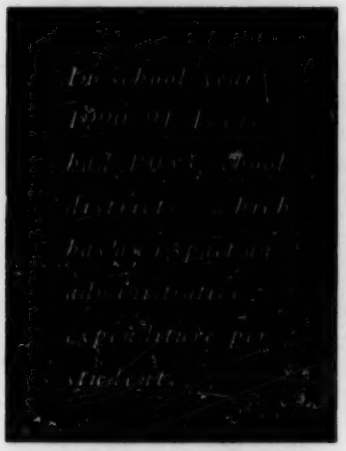
6. What administrative expenditure limits make sense?

We used data from the Texas Education Agency's Public Education Information Management System (PEIMS) to analyze school district expenditures. PEIMS classifies expenditures into 18 functional categories. We classified six of these categories as administrative expenditure: General Administration, School Administration, Instructional Administration, Curriculum and Staff Development, Communication and Dissemination, and Data Processing Services. In school year 1990–91, these combined expenditures represented about 13 percent of public school expenditures in the state of Texas.

Our study was funded by the state legislature through the Educational Economic Policy Center. Overall, the study recommended specific administrative expenditure limits that would redirect an estimated $289 million per year (approximately $80 per-pupil) to the classroom by school year 1996–97.

An Overview of Administrative Expenditure in Texas School Districts

In school year 1990–91, Texas had 1,053 school districts. Although several of these districts are large (Houston, with almost 200,000 students, is the fifth largest school district in the nation; Dallas, with 138,000 students, is the 10th largest school district), most are very small. The median Texas school district contained 775 students in 1990–91, and there were 393 districts with less than 500 students. The smallest district, Allamoore, had only two students (see Table 1).



This proliferation of small districts has an impact on administrative expenditure per student. Even very small districts are likely to hire a superintendent or principal, or both. Of the 211 districts in Texas that had only one campus in 1990–91, 92 employed both a full-time superintendent and a full-time principal. State funding formulas provide extra money per student for districts that are very small and/or have very low population densities. As a result, the administrative spending per student and the ratio of administrative to instructional spending are higher in small districts, as shown in Figures 1 and 2. Beyond a district size of around 2,000 students, however, these apparent economies of scale vanish. Table 2 compares administrative expenditures for large and small districts in Texas.

Definition of Administrative Expenditure

Since the policy issue we were concerned with was whether to penalize districts with excessive administrative expenditures, we used a broad definition of these expenditures to discourage creative accounting. We thought it particularly important to include school administration (category 23) in our definition, since measured administrative expenditure could be reduced by paper reassignments of central office personnel to specific campuses. Likewise, omission of instructional administration (category 21) from the state's definition of administrative expenditure might result in a proliferation of curriculum coordinators in school district offices. Table 3 shows the types of expenditures that were classified as administrative and non-administrative expenditures.

We considered several types of administrative expenditure ratios for use in our analysis. In particular, we might have focused on:

- the administrative expenditure per student;
- the ratio of administrative to instructional expenditure;
- the ratio of administrative to total operating expenditure.

Defining instructional expenditure as category 11 in the PEIMS data, we based most of our recommendations on the ratio of administrative to instructional expenditure, for three reasons:

1. Districts could improve their ratio in four ways, all of which are desirable:
   a. reduce administrative expenditure per student;
   b. shift resources from administration to instruction;

Table 1.—A profile of Texas school districts

Characteristics	School Year 1990–91	1991–92	1992–93
Number of districts	1,053	1,050	1,048
Number of districts with:			
Less than 2,000 students	778	766	760
Half the students	46	46	46
More than 20,000 students	35	37	38
Enrollments			
Smallest district	2	2	7
Largest district	194,208	196,512	198,013
Total spending per student			
95th percentile[1]	$8,136	$8,330	$8,522
75th percentile	5,203	5,605	5,893
50th percentile	4,454	4,724	5,084
25th percentile	3,978	4,247	4,547
5th percentile	3,542	3,774	4,051
State average (Texas)	4,200	4,452	4,774
U.S. average[2]	4,890	5,103	5,334

[1] Represents spending in the 95th percentile district, not spending on the 95th percentile student. The latter number would be substantially lower, since many of the highest-spending districts are very small.

[2] Texas and U.S. average spending per student are not adjusted for differences in the cost of living between Texas and the United States as a whole.

SOURCE: Texas Education Agency, *Snapshot 91'*, *Snapshot 92'*, and *Snapshot 93'*.

Table 2.—Spending in large and small Texas school districts

Spending	Districts with: More than 2,000 students	Less than 2,000 students	All districts
Spending per student	$4,128	$4,611	$4,200
Administrative spending per student	451	594	472
Administrative/instructional spending	22.9%	27.6%	23.6%
Administrative/total spending	10.9%	12.9%	11.2%

SOURCE: Texas Education Agency, *Snapshot 91'*, *Snapshot 92'*, and *Snapshot 93'*.

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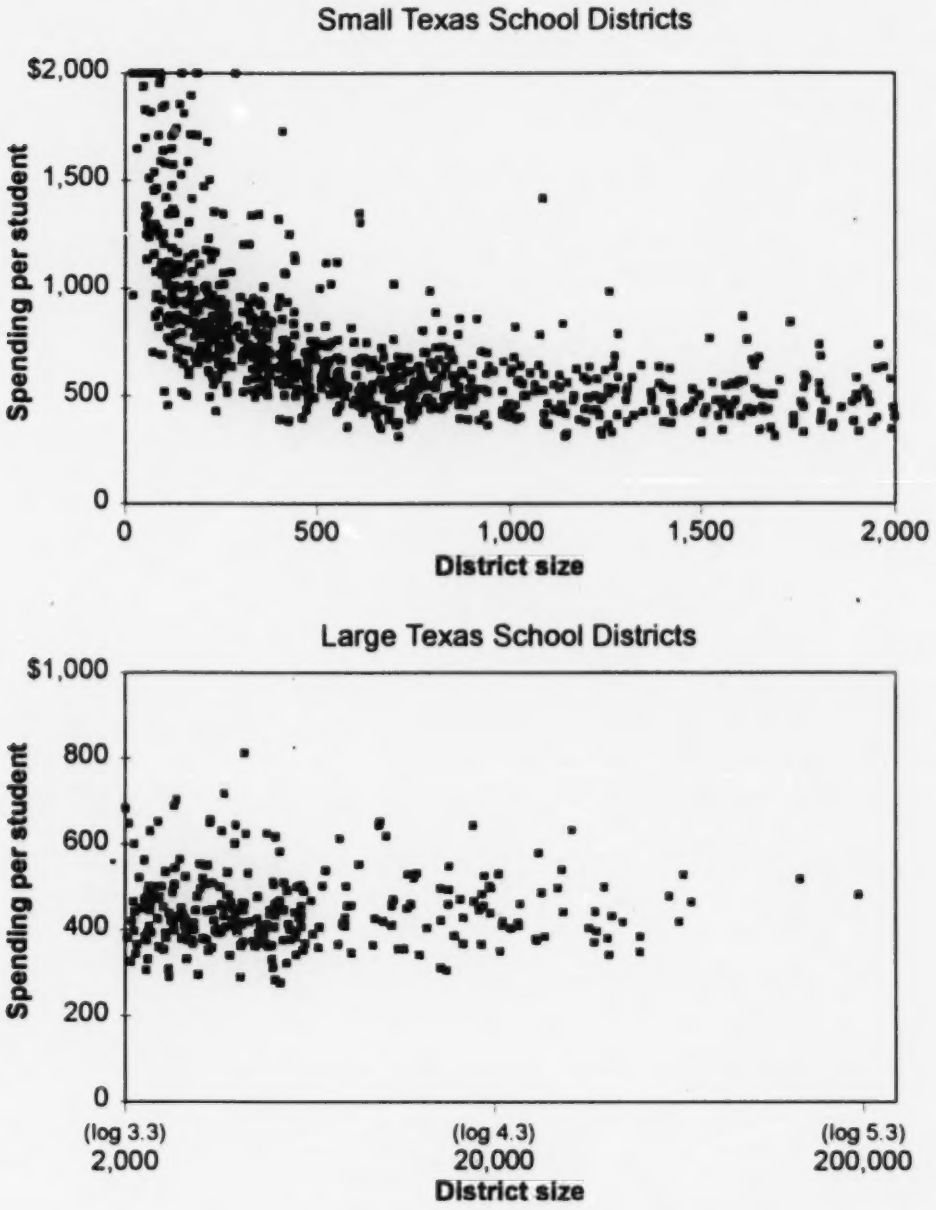
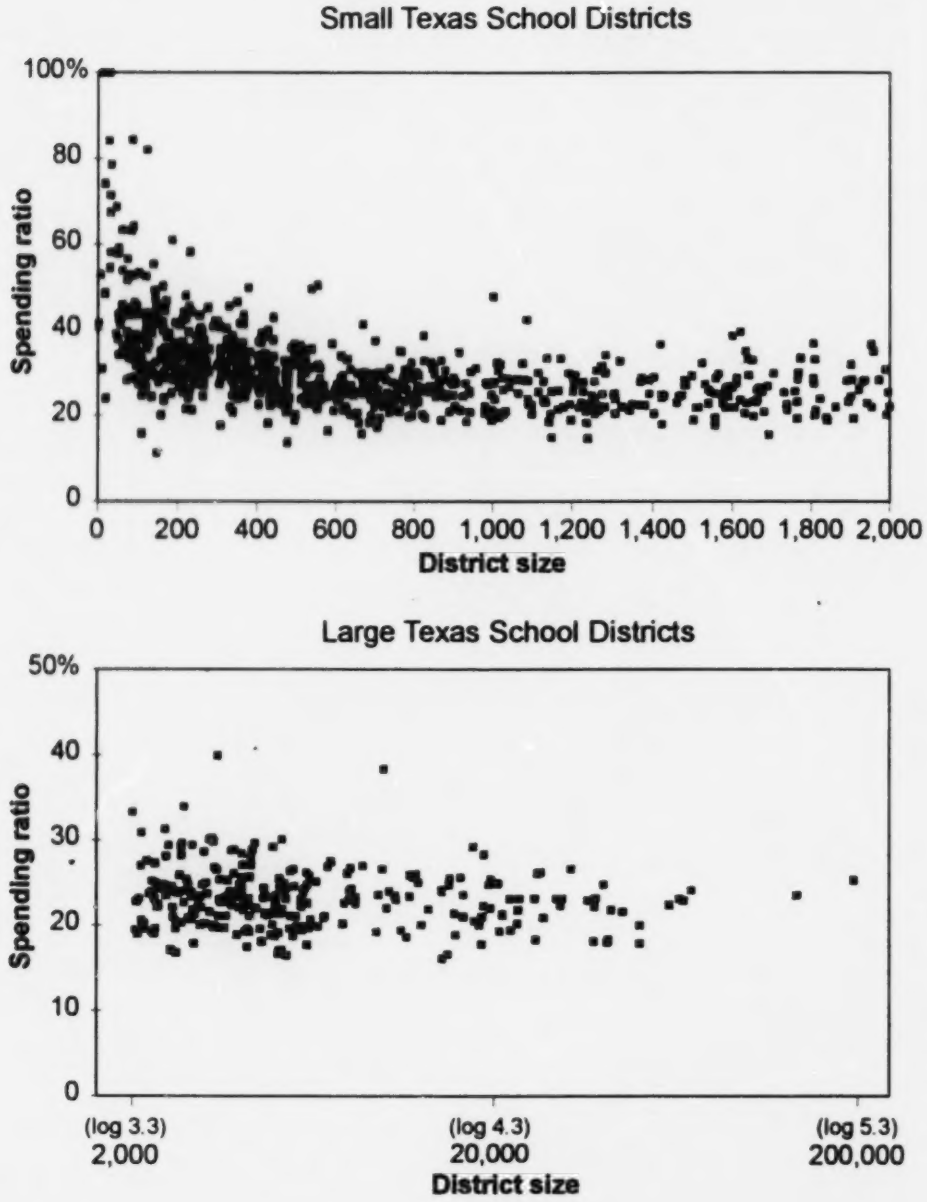
Figure 1.—Spending per student on administration in small and large Texas school districts



SOURCE: Texas Education Agency, Public Education Information Management System (PEIMS) data.

Figure 2.—Administration/instruction spending ratio in small and large Texas school districts



SOURCE: Texas Education Agency, Public Education Information Management System (PEIMS) data.

Table 3.—PEIMS expenditure categories

Expenditure Categories Defined as Administrative Cost:	
Category Number	Definition
21	Instructional Administration
23	School Administration
25	Curriculum and Staff Development
26	Communication and Dissemination
41	General Administration
75	Data Processing Services
Other PEIMS Expenditure Categories:	
Category Number	Definition
11	Instruction
22	Instructional Resources and Media Services
31	Guidance and Counseling Services
32	Social Work Services
33	Health Services
34	Student Transportation
36	Co-curricular/Extracurricular
37	Food Services
42	Debt Services
51	Plant Maintenance and Operations
52	Facilities Operation and Construction
81	Community Services

SOURCE: Texas Education Agency.

c. shift resources from other non-instructional areas to instruction; and

d. use increased tax revenues to increase overall spending for instruction.

Use of a per-student administrative spending measure sacrifices the incentive for options (c) and (d), while the administrative/total operating expenditure measure does not provide an incentive for (c).

2. There would be no need to change the "allowable" ratio every year to adjust for inflation and increases in school district expenditures and revenues, as would be the case with a per-pupil measure.

3. Fewer variables would need to be taken into account in adjusting allowable district administrative expenditure for factors that are beyond the district's control. A per-pupil measure would require consideration of seven such variables, while the ratio

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measure requires adjustment only for size and the district's percentage of Limited English Proficient (LEP) students.

School spending in Texas consists of expenditure from the general fund (Fund 10), and a large number of special revenue funds dedicated to categorical programs, such as Chapter 1 and the Job Training Partnership Act. The administrative expenditure ratio for all of these programs combined is only slightly higher than for the general fund; however, this ratio varies widely across programs. For example, a grant to write a new curriculum might be counted almost entirely as administration.

In order not to penalize districts for receiving those grants, we separated the general fund (Fund 10) from categorical funds, and recommended excluding the categorical programs when calculating the ratio of administrative to instructional expenditure.

Variables Associated with Administrative Expenditure

We used ordinary least squares regression to determine which variables are systematically associated with administrative expenditure, measured on a per-pupil basis or as a ratio of administrative to instructional expenditure. Our working assumption was that causality runs one way from each of the variables in Table 4 to administrative expenditure per student or the administration/instruction expenditure ratio. Our initial hypotheses are shown in the right-hand column of Table 4.

School spending in Texas consists of expenditure from the general fund (Fund 10), and a large number of special revenue funds dedicated to categorical programs...

Our actual analysis, as shown in Tables 5 and 6, revealed the following results:

- Instructional spending per student increases in large districts.
- Wealth has the expected effect on administrative spending per student. Moreover, school districts treat administration as a luxury good: other things equal, the administration/instructional expenditure ratio rises as wealth increases.
- Reducing the number of campuses has the expected effect on the administrative/instructional expenditure ratio. However, this effect appears not because districts with fewer and larger campuses are spending less on administration, but because they are spending more per student on instruction.
- More teachers per 100 students (a lower pupil-teacher ratio) leads to more administrative spending per 100 students. In small districts, however, administrative expenditure does not increase as rapidly as instructional expenditure.
- Districts with more LEP students, many of them heavily Hispanic districts in the Rio Grande Valley of Texas, spend more on administration both per-pupil and relative to instruction.
- Small districts with a higher percentage of special education students spend less on administration.
- Compensatory education only has an impact on administrative expenditure in large districts. This is because the administrative expenditures associated with Chapter 1 are categorical program expenses not included in the Fund 10 expenditures counted in this analysis.

Table 4.—Variables which might affect administrative expenditure

Variable	Initial hypothesis
District size	Larger districts should have lower administrative costs per student relative to instructional expenditures. However, beyond around 2,000 students, there are no additional expenditure savings from additional size.
District wealth	Wealthier districts should spend more per student, but it is not obvious whether they would spend more relative to instruction.
Average campus size	For a given district size, a larger campus size implies fewer campuses, saving on both measures of administrative expenditure.
Student-teacher ratio	A higher student-teacher ratio implies fewer teachers per student to supervise, lowering administrative expenditure per student; it is not obvious what happens to the administrative/instructional expenditure ratio.
Percent of LEP students	More bilingual students implies more expense in curriculum development, raising administrative expenditure per student; it is not obvious what happens to the administrative/instructional expenditure ratio.
Percent of students in special education	Same as for LEP students.
Percent of low income students	Same as for LEP students.
Percent mobile students	Higher student mobility increases the expenditure of keeping track of students, raising administrative expenditure per student and the administrative/instructional expenditure ratio.
Administrative salary index	Higher administrative salaries in neighboring districts increase administrative expenditure per student; if teacher salaries are also higher, it is not obvious what happens to the administrative/instructional expenditure ratio.
Five-year percent change in enrollment	Districts may adjust their administrative spending with a time lag when enrollments increase, causing a negative relationship between this variable and both measures of administrative expenditure.

SOURCE: Chrys Dougherty's hypotheses.

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Table 5.—Variables associated with administrative expenditure

Variables	Dependent variable: Administrative/instructional ratio — Small districts	Administrative/instructional ratio — Large districts	Admin exp/student — Small districts	Admin exp/student — Large districts
Natural logarithm of district size	-	(-)	-	
Natural logarithm of district wealth	+	+	+	+
Average campus size (in hundreds)	(-)	-	+	
Student-teacher ratio	+	-	-	-
Percent LEP students	+	+	+	+
Percent special education students	(-)		-	
Percent low income students				(+)
Student mobility rate		+		
Administrative salary index				
5-year percent enrollment change		(-)		(-)

Parentheses imply significance at the 10% level; no parentheses imply significance at the 5% level or better.

SOURCE: Chrys Dougherty's statistical analysis.

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Table 6.—Results of administrative expenditure regressions

Variables	Dependent variable: Administrative/instructional ratio — Districts with greater than 2000 students	Administrative/instructional ratio — Districts with less than 2000 students	Admin exp/student — Districts with greater than 2000 students	Admin exp/student — Districts with less than 2000 students
Constant	0.249	0.137	217.1	-187.8
	(3.76)	(1.68)	(1.02)	(-1.14)
Natural logarithm of size	-0.060	-0.005	-213.8	-2.26
	(-11.5)	(-1.68)	(-12.7)	(-0.38)
Natural logarithm of wealth	0.030	0.013	217.7	83.2
	(7.75)	(2.76)	(17.0)	(8.52)
campsize (in hundreds)	-0.005	-0.005	25.6	-3.69
	(-1.77)	(-2.94)	(2.38)	(-1.01)
stu/tch	0.006	0.000	-52.8	-20.0
	(2.99)	(0.02)	(-8.76)	(-4.88)
Percent LEP	0.002	0.001	6.81	2.47
	(3.41)	(2.62)	(4.77)	(4.18)
Percent special ed.	-0.001	-0.001	-11.1	-3.39
	(-1.82)	(-1.39)	(-5.36)	(-1.60)
Percent low income	0.000	0.000	-0.318	0.662
	(0.69)	(0.89)	(-0.58)	(1.81)
mobility	0.000	0.001	-0.583	0.895
	(0.04)	(2.42)	(-0.66)	(1.55)
salindex (in thousands)	0.002	0.001	-3.13	2.53
	(1.35)	(0.91)	(-0.80)	(1.37)
Percent sizchg	0.000	-0.000	-0.412	-0.566
	(1:29)	(-1.68)	(-0.79)	(-1.96)
R^2	.462	.137	.762	.440
Adjusted R^2	.455	.104	.759	.418

NOTE: t-statistics are in parentheses.
SOURCE: Chrys Dougherty's regressions using PEIMS and TAAS data from the Texas Education Agency.

- High student mobility has little effect on administrative spending per student.
- Administrative salaries paid in neighboring districts have no impact.
- High percentage enrollment increases have the expected effect, but only in large districts.

The Relationship Between Administrative Expenditure And Student Learning

To examine the relationship between administrative expenditure and student learning, we regressed test score data on a set of demographic and expenditure variables. The dependent variable we used was the average of the third- and fifth-grade reading, writing, and mathematics scaled scores on the Texas

Assessment of Academic Skills (TAAS) test, which was administered in Texas elementary schools in October 1990. These scaled scores had a mean of 1,600 and standard deviation of 73.3. We had data on these scores in 1,323 schools.

Gain scores— the average difference between individual students' test scores in consecutive years— would be a more appropriate dependent variable to use in this analysis. However, the TAAS at the time was not designed to be gain-scored, and was not administered to the same students in successive years. Thus, we lacked the data to implement this more desirable alternative.

The independent variables we used were:

- percent low income students
- percent black students
- percent Hispanic students
- percent LEP students
- percent of students in special education
- percent mobile students
- district size
- campus size
- student-teacher ratio
- teacher's average years of experience
- expenditure per teacher on central administration
- expenditure per teacher on school administration
- expenditure per teacher on instructional administration
- expenditure per teacher on counseling, health, and social work services
- expenditure per teacher on instruction

The results, as shown in Table 7, indicate that there is little association between administrative spending per teacher and student learning. However, there is also no evidence that administrative spending has a *negative* effect on instruction. We were unable to explain the opposite-sign relationships between campus and instructional administrative spending and student learning.

The results indicate that there is little association between administrative spending per teacher and student learning.

What Do Districts With Unusually High Administrative Expenditures Do Differently?

We selected seven Texas school districts with unusually low or high ratios of administrative to instructional expenditure. For site visits our judgment about which districts' administrative costs are unusually low or high was based on residuals from a regression equation similar to that used in Table 5.

When administrative expenditures are especially high, how do school districts spend the money? In some cases, the district uses the school district administrative budget as an employment program. One high-expenditure district with 18,000 students had a staff of 2,500 of whom 995 were teachers. This district had the state's 13th-highest ratio of non-teachers to total staff. Judging from interviewees' comments in a number of districts, "kicking the bad principals upstairs" into the central office is a fairly common practice.

Other districts have special circumstances. One small, suburban high-wealth district hired extra staff to process the thousands of job applications received each year from teachers anxious to work in that district. Another district was paying three superintendents, two of whom had been dismissed from multi-year contracts in the previous two years. One of these former superintendents had sued the district for wrongful termination, creating high legal costs as well.

Table 7.—Results of test score regressions

Variables	TASS Scaled Score	TASS Scaled Score
Constant	1,658.7	1,649.2
Percent low-income students	-1.83	-1.84
	(-16.8)	(-17.0)
Percent black students	-0.592	-0.571
	(-5.64)	(-5.45)
Percent Hispanic students	-0.236	-0.216
	(-2.25)	(-2.06)
Natural logarithm of district size	4.78	5.80
	(4.48)	(3.98)
campus size	-0.012	-0.009
	(-1.64)	(-1.12)
Student-teacher ratio	-2.37	-2.244
	(-3.28)	(-3.03)
Teachers average years of experience	1.22	1.358
	(2.07)	(2.30)
Expenditure per teacher on total administration (in thousands)	1.360	--
	(1.34)	
Expenditure per teacher on central administration (in thousands)	--	1.31
		(0.80)
Expenditure per teacher on school administration (in thousands)	--	3.88
		(2.30)
Expenditure per teacher on instructional administration (in thousands)	--	-5.57
		(-2.10)
Expenditure per teacher on classroom instruction (in thousands)	0.573	0.449
	(1.38)	(1.08)
R^2	.636	.638
Adjusted R^2	.632	.634

NOTE: t-statistics are in parentheses.
Variables which were not statistically significant are not shown: percent LEP students, percent special education students, percent mobile students, and expenditure per teacher on counseling, health, and social work services.

SOURCE: Chrys Dougherty's regressions using PEIMS and TAAS data from the Texas Education Agency.

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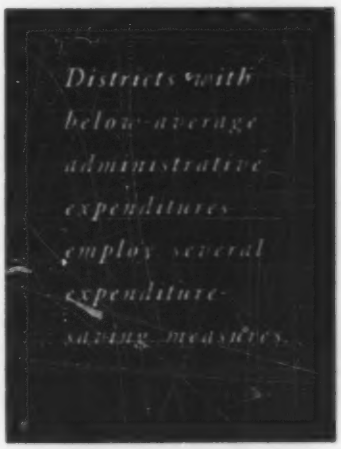
What Do Districts With Unusually Low Administrative Expenditures Do Differently?

Districts with below-average administrative expenditures employ several expenditure-saving measures. First, they limit expenditures on instructional administration, relying on their teachers or the state's Regional Educational Service Centers for curriculum development services. Second, they expect senior administrative staff to share clerical and support staff. Third, they pay their administrators less. This option may not be available to districts that hope to attract top-flight principals and superintendents, however.

An underutilized option is the formation of multi-district cooperatives to share expenditures in areas such as curriculum development and data processing. To examine the use of cooperatives, our study contacted 48 school districts, 25 with a high administrative/instructional expenditure ratio and 23 with a low administrative/instructional expenditure ratio. While 46 of these districts participated in cooperatives to pool resources for special education and several do the same for vocational education, only two districts were members of cooperatives designed to achieve economies in general administrative expenditures. One district was part of a seven-district cooperative designed to share data processing expenses. The second cooperative served 13 districts, providing services in data processing, staff development, and technology support.



Recommendations Made Based on the Administrative Expenditure Study

As a result of our study, we made the following recommendations to the Texas legislature in 1993:

- Define administrative expenditure broadly (including campus and instructional administration) to limit creative accounting.
- Establish allowable ratios of administrative to instructional expenditure.
- Set these ratios at the 1990–91 statewide average, to be reduced to 85 percent of that average in three years.
- Adjust the allowable ratio for district size and percent of students in bilingual programs.
- Withhold a dollar of state funding for every dollar by which the district exceeds its allowable expenditure ratio.

We projected that this approach would redirect $269 million into the classroom by the 1996–97 school year, or about $70 per student based on an enrollment of 3.8 million students in Texas. Compelling small districts' administrative/instructional expenditure ratio to conform to the state average would redirect an additional $20 million.

What Passed the Legislature in the 1993 Session

Distracted by school finance issues and the threat of a court-ordered shutdown of public schools, the 1993 Texas Legislature paid relatively little attention to administrative expenditure. The administrative expenditure control measure that passed was considerably different from the one recommended in the Administrative Expenditure Study. The Legislature divided school districts into five size categories, and specified that the Commissioner of Education would set allowable ratios of administrative to instructional expenditure for each category. "Administrative expenditure" as

defined by the legislature excludes campus administration, but includes state and local categorical programs.

This legislation was first implemented in the 1993–94 school year. As actual expenditure data from subsequent years become available, it should be possible to assess the impact of this legislation.

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Administrative Expenditure Limits For Texas Public School Districts

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Introduction

As resistance to local and state tax increases sweeps the nation, policy makers have sought new revenues for programs and proof that tax dollars are being spent efficiently. The Texas Legislature enacted legislation in 1993 intended to achieve each of these goals. By requiring school districts to limit their administrative expenditures to a percentage of their instructional expenditures, the legislature sought to limit administrative spending. This limit, in turn, provided a mechanism to increase instructional expenditures within existing educational revenues.

Texas' 1993 school finance statute, referred to as Senate Bill 7 (SB 7), requires the establishment of administrative expenditure standards for school districts, the monitoring of administrative expenditures by the Texas Education Agency (TEA), and the recovery of funds from districts that do not meet these standards. This presentation reviews the implementation of the administrative expenditure provisions of SB 7, the use of the state's educational and financial data in that implementation, and the policy implications and findings from application of this statute to 1992–1993 school district expenditures.

Overview of the Administrative Expenditure Limit Plan

Administrative Expenditure Calendar

The statute to limit administrative expenditures in Texas can be found in Section 16.205 of the Texas Education Code. Table 1 provides the implementation calendar created in the statute.

The implementation calendar runs in overlapping three year cycles. In the initial year of each cycle, prior year expenditures are analyzed by computing a ratio of specific administrative and instructional expenditures. This ratio is compared to a standard established by the commissioner of education. Districts exceeding their standard are placed on

Table 1.—Implementation timeline for administrative expenditure limits

	First Cycle	Second Cycle	Third Cycle
Year 1	Prior year actual expenditures examined; Notification sent to districts exceeding their standard.		
Year 2	Notified districts plan budgets accordingly and expend funds.	Prior year actual expenditures examined; Notification sent to districts exceeding their standard.	
Year 3	Prior year actual expenditures examined. If notified districts exceed standard in prior year, state recovers excess.	Notified districts plan budgets accordingly and expend funds.	Prior year actual expenditures examined; Notification sent to districts exceeding their standard.
Year 4		Prior year actual expenditures examined. If notified districts exceed standard in prior year, state recovers excess.	Notified districts plan budgets accordingly and expend funds.
Year 5			Prior year actual expenditures examined. If notified districts exceed standard in prior year, state recovers excess.

SOURCE: Texas Education Agency.

a *notified* status. These districts are required to submit a plan by which their expenditures will meet their standard in the subsequent school year. This gives districts time to design and adopt a budget knowing the standard to which they will be held accountable. Only notified districts are examined in the final two years of the cycle.

In the cycle's third year, the TEA examines each notified district's prior year expenditures. If these expenditures generate a ratio *below* the standard, the district completes its obligation in the first cycle. If the district's ratio is *above* the standard, the state recovers the amount by which the district would have to reduce its administrative expenditures to meet the standard.

A new three year cycle begins with every school year. Because of this, a district that is notified in the first year of one cycle could be below its standard in

the next cycle's first year, or vice versa. The decision to re-evaluate the standards is up to the commissioner of education.

Evaluation Groups

Recognizing that expenditure patterns vary with enrollment differences, the statute requires the commissioner of education to establish standards for five categories of districts defined by average daily attendance (ADA). The commissioner of education may re-evaluate the standards as necessary. To promote stability during the initial phases of implementation, the commissioner chose to maintain the same set of standards for the first two implementation cycles.

The statute also allows the commissioner to make allowances for districts that receive a funding adjustment due to their scarcity or that educate a large proportion of students with special needs. The commissioner established a sixth category for districts that contain between 40 and 130 students and are at least 30 miles or more from the nearest high school district.

Early staff proposals anticipated dividing each category of districts into quartiles based on percentage of special needs students. Districts would have received an adjustment based on their quartile ranking. However, analysis of historical data showed that the standards ultimately adopted did not affect districts as a function of special needs students. This finding, plus the fact that a district could not directly calculate its 'special needs' rank, led the commissioner to drop an explicit special needs population adjustment.

Setting Standards

The statute also prescribed the fund types, functions, and objects of expenditure that would be used for calculating the administrative expenditure ratio. Only non-federal funds were used in evaluating both instructional and administrative expenditures. A policy decision was made to exclude state funded expenditure arrangements for districts because including these expenditures tended to hurt districts that acted as cooperatives' fiscal agents. Although involving relatively little revenue, this decision created an additional incentive for districts to develop cooperative arrangements.

The statue also specifically limited administrative expenditures to accounting functions 21 (Instructional Administration) and 41 (General Administration). Instructional costs were similarly limited to accounting functions 11 (Instruction), 22 (Instructional Resources and Media Services), 25 (Curriculum and Instructional Staff Development), and 31 (Guidance and Counseling Services).

Finally, the administrative expenditure ratio was calculated using only operating expenditures - payroll, contracted services, supplies and materials, and other operating expenses.

These provisions were summarized in a worksheet provided to school districts for calculating the administrative expenditure ratio (Table 2).

School District Finance Data in Texas

The TEA has two independent systems for collecting financial information from school districts. The major educational data collection effort is called PEIMS (the Public Education Information Management System). PEIMS is designed to provide "useful, accurate, and timely information on student demographics and academic performance, personnel, and school district finances." (16.007 (c), Texas Education Code). Through PEIMS, the TEA receives budget and actual financial information from school districts on an annual basis.

SB 7 requires that PEIMS expenditure data be used for the implementation of the administrative expenditures provision. Actual financial data is available for analysis through PEIMS for a given school year around the start of the next calendar year.

Table 2.–Computation of District Administrative Expenditure Ratio for the 1992–93 School Year

Expenditures from P.Actual 93 (PEIMS) in Funds 11 (Local Maintenance) and 14 (Technology)

Administrative Expenditures

Functions	Objects 6100 Payroll Costs	6200 Purchased Contracted Services	6300 Supplies and Materials	6400 Other Operating Expenses
21 - Instructional Administration				
41 - General Administration				
Total of Administrative Expenditures		Total = A		

Instructional Expenditures

Functions	Objects 6100 Payroll Costs	6200 Purchased Contracted Services	6300 Supplies and Materials	6400 Other Operating Expenses
11 - Instruction				
22 - Instructional Resources				
25 - Curriculum and Development				
31 - Guidance and Counseling				
Total of Instructional Expenditures		Total = B		

1992–93 Administrative Cost Ratio (A/B) = Ratio

SOURCE: Texas Education Agency.

For example, the first implementation of the statute considered 1992–93 school year actual expenditures in January 1994. This lag is part of the reason for the administrative expenditure statute's three year cycle.

The second type of financial data that districts submit is their annual audited financial statement. Because of timing, expenditure data submitted under PEIMS is compiled prior to certification by an independent auditor. It often takes districts several months to submit a corrected audit to the TEA. In the event, audit data was used to check the administrative expenditure ratio results derived from PEIMS data. The audit information was valuable in finding districts with inaccuracies in their PEIMS submissions.

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Findings and Policy Implications

Findings

The statewide average instructional to administrative expenditure ratio has declined each year since 1988 and is shown graphically in the chart. It is anticipated that the ratio will continue to fall as the number of students in Texas increases through the end of the decade.

Table 3 summarizes the first year's implementation of the administrative cost provisions of SB 7. It includes a breakdown by the six district groups, their standard ratio, the number of districts in the group, the number and percent of districts in excess, and the amount of excess dollars.

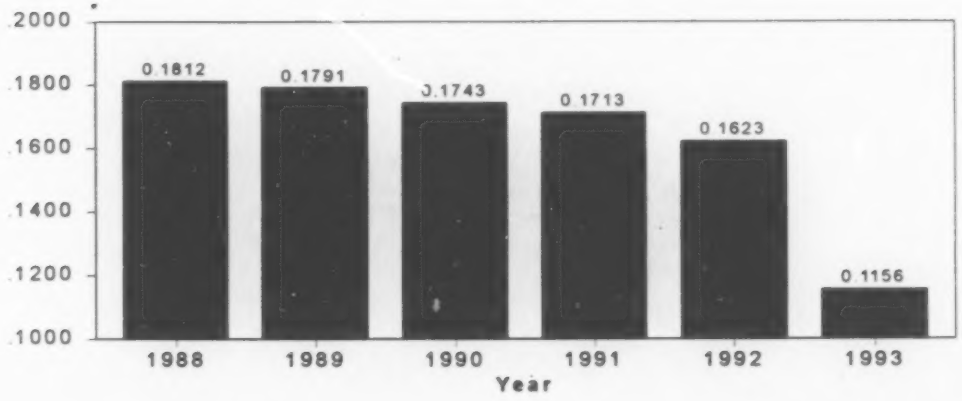
In 1992–1993, 12 percent of all Texas districts exceeded their expenditure standard. These districts had a combined $15 million more in administrative expenditures than their standards allowed for given their level of instructional expenditures. The five largest districts of the 121 accounted for almost $6 million of the excess, while the smallest 57 percent of the districts accounted for only 12 percent of the excess.

Districts between 5,000 and 9,999 ADA were the most likely to be above their standard. This category contains the fewest and probably the most heterogeneous collection of districts. Included in this category are large suburban districts and stable non-metropolitan districts.

Not one of the state's 27 largest districts exceeded its administrative expenditure standard. This is probably due to the economies of scale enjoyed by large districts.

While not simply related to district wealth, the probability that a district exceeds its ratio was related to district tax effort. As tax rates increase so does the probability that a district will exceed its administrative expenditure standard.

Figure 1.—Ratio of Administrative to Instructional Costs



SOURCE Texas Education Agency

Table 3.–Application of Administrative Expenditure Standards to 1992–93 Actual Expenditures

ADA Group	Greater than 10,000	5,000 to 9,999	1,000 to 4,999	500 to 999	Less than 500	Sparse	TOTALS
Standard	.1105	.1250	.1401	.1561	.2654	.3614	
Districts in Group	68	49	329	205	301	94	1,048
Districts Exceeding Standard	5	11	52	22	20	11	121
Percent of Districts Exceeding Standard	7	22	16	7	12	12	12
Excess Administrative (in thousands) Dollars given to Instructional Expenditures	$5,955	$2,659	$4,600	$966	$733	$157	$15,074

SOURCE: Texas Education Agency.

Limiting Administrative Expenditures with a Ratio Approach

The basis for Texas' administrative expenditure limits is a ratio between administrative and instructional expenditures. Such an approach has advantages and disadvantages. If the intent is to reduce total expenditures, a ratio approach is not a good option. During the development of the administrative expenditure proposal, policy makers hoped to save the state hundreds of millions of dollars by trimming supposed administrative fat from school district budgets. However, evaluation of the 1992–1993 expenditures revealed only $15 million of administrative expenditures beyond what standards allowed given instructional expenditures of $7.9 billion.

Since the ratio approach only compares instructional to administrative spending, many Texas districts will simply and legally alter accounting practices to reduce their administrative expenditure ratios. For example, a small district may employ a superintendent who functions as a transportation coordinator and classroom teacher. Instead of charging the superintendent's salary entirely to general administration, it could be proportionally charged to transportation and instructional functions. This change would lower the districts administrative expenditure ratio.

The ratio approach has the advantage of being a good planning tool for districts. It can easily be incorporated into all phases of a district's budget process. Expenditures can also easily be tracked to determine year-to-date compliance with the standard.

The ratio can be used as a comparison between districts. As such, it could lead to finding more efficient ways of operating school districts.

Problems for Small Districts

Districts with low enrollments can have particular problems meeting their standard. First, such districts may not have administrative staff members with expertise in school district accounting principles to take full advantage of the opportunities mentioned earlier. Prior to this legislation, districts did not have a financial incentive to charge proportionally the salary of employees that perform more than one function to each function. This statute has caused many districts to reconsider such practices.

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Small districts also spend a higher proportion of their administrative budgets on obligatory expenditures. Examples of such expenditures include an independent financial audit of the district's books and tax collection and property appraisal fees levied by the district's county appraisal district. It is possible for districts that educate only a few students to find their allowable administrative expenditures below the amount they expend on non-discretionary items.

Among small districts, those that are gaining students have an easier time meeting their standard than do those that are depopulating. As the number of students increases, a greater percentage of new spending occurs in instruction. However, when student enrollment drops, districts have a harder time reducing administrative expenditures, many of which act as if fixed. Simply stated, student population changes affect instructional expenditures (i.e., teacher salaries) more directly than administrative expenditures. Because of this, a depopulating district's administrative expenditure ratio becomes less favorable as instructional expenditures fall while administrational expenditures remain stable.

Excess Expenditures

Under the provisions of SB 7, a district is notified that is has exceeded its standard whether that excess is $100 or $100 million. The amount of that excess does not predict whether the notified district will again exceed its standard or, if it does, the amount by which it will exceed that standard. However, this initial excess amount becomes the focus of the legislature, media, and subsequently the taxpayers. Policy makers and the public should be educated to the fact that excess money is not immediately available to districts for new programs or recovery by the state.

Conclusions

The implementation of a new statute limiting administrative expenditures in Texas school districts has had some interesting effects. Regardless of the amount of funds recovered by the state, the new law has caused many districts to look at administrative efficiencies while maximizing expenditures for instruction. Specifically, school districts now have explicit standards to follow in planning budgets. As the implementation of this statute proceeds, the yield from this effort to develop more efficient district administration will become more obvious.

Richard Rothstein
Economic Policy Institute

About the Author

Richard Rothstein is a research associate of the Economic Policy Institute, adjunct professor of public policy at Occidental College in Los Angeles, and editorial board member of The American Prospect. He writes on public policy for a variety of publications.

Rothstein's article in this journal summarizes highlights from his full report, *Where's the Money Gone?* Changes in the Level and Composition of Education Spending, 1967–1991, by Richard Rothstein with Karen Hawley Miles, a school district consultant and doctoral candidate at Harvard's Graduate School of Education. The report was published by the Economic Policy Institute in November, 1995, based on a two-year data gathering project in nine typical U.S. school districts. Funding for the report and data collection was provided by the Metropolitan Life Foundation.

Rothstein was co-editor, with Edith Rasell, of *School Choice: Examining the Evidence*, also published by the Economic Policy Institute (1993). In addition to education, he also researches international trade and labor standards. Prior to his work at the Economic Policy Institute, Rothstein was a program analyst for the Los Angeles school board. He was previously a high school teacher, college instructor, and union officer and representative.

Rothstein is currently revising the report summarized here, to include data through school year 1995–96. He plans, in spring, 1997, to publish a follow-up report, covering programmatic changes in school spending from 1966–67 to 1995–96, and from 1990–91 to 1995–96.

Rothstein welcomes comments and inquiries about this work, via e-mail to <rothstei@oxy.edu>.

Summary of *Where's the Money Gone*: Changes in the Level and Composition of Education Spending (1967–1991)

Richard Rothstein
Economic Policy Institute

When Benno Schmidt resigned Yale's presidency to head a private school network, he explained why he had given up on public schools: "We have roughly doubled per-pupil spending (after inflation) in public schools since 1965," but the "nation's investment in educational improvement has produced very little return."[1]

This is a conventional claim of public school supporters and critics alike. School finance expert Allan Odden notes that "real" education expenditures increased by 58 percent in the 1960s, 27 percent in the 1970s, and 30 percent in the 1980s, "but student performance—and thus education productivity—have not improved that much." According to a Brookings Institution report by John Chubb and Eric Hanushek, "since the Soviets launched...Sputnik,...real expenditures per student rose at an annual rate of 3 3/4 percent, nearly tripling between 1960 and 1988... Spending has nearly tripled and performance has dropped."

[1] Schmidt, Benno C., Jr. 1992. "Educational innovation for profit." *The Wall Street Journal*, June 5.

The declining "productivity" claim is so well established that few analysts have sought empirical verification. Rather, the notion is a prelude to reform prescriptions; if, after all, growth in public education spending has outpaced any rise in school achievement, the challenge is to design systems that use money more effectively, with no need to consider proposals for additional funds.

While education spending has risen substantially, the increase is both smaller and more complex than most assume: real school spending increased by 61 percent between 1967 and 1991, about half the expected real growth. Barely one-quarter of this increase occurred in "regular education," the traditional school activities whose outcomes can be measured in test scores, graduation rates, etc.

In this analysis, we did not adjust the 1967 school expenditure data with the Consumer Price Index for all urban consumers (CPI-U). Instead, the Economic Policy Institute (EPI), with assistance from the Bureau of Labor Statistics (BLS), developed a modified index (we call it the "net services" index (NSI)) to measure inflation in service industries like

education. When we use the NSI to adjust schools' average per-pupil spending of $687 in 1966–67, we find that "real" spending in 1967 was $3,456. Real school spending growth is the amount of new money spent in excess of inflationary changes measured by the NSI—or 61 percent real growth.

Assigning Expenditures to Programs

States and districts do not normally report school spending data by program type, although education researchers increasingly ask them to do so. To understand which programs received which funds, we first defined the programs and then categorized each expenditure of the nine sample districts by program and employee type (i.e., teachers, aides, other professionals, or other employees).

When classifying programs into categories, we found that distortions are inevitably implied by any taxonomy of school programs. Former Education Secretary William Bennett's accusation that schools waste funds in an "administrative blob" has led many researchers to focus on distinguishing administrative from classroom costs. They generally find administrative costs (central and school-level) of 8 percent to 17 percent. We, on the other hand, assigned many expenditures, often termed "administrative costs," to programs.

States and districts do not normally report school spending data by program type, although education researchers increasingly ask them to do so.

The conventional focus on the distinction between "classroom" and "administrative" expenditures implicitly posits an industrial model of schools: classrooms are like factory floors where "direct" teaching labor carries out production, while other functions provide indirect support. But, as in manufacturing, schools do not succeed as "direct to indirect" ratios increase. Success depends on the intelligence with which the enterprise is planned and coordinated, as well as on the product mix created. The implicit notion in educational debate that classrooms are "profit centers," while curriculum libraries or school buses are "cost centers," prevents thoughtful analysis of programmatic productivity. Central office development of curriculum guides, for example, and teachers' transmission of this curriculum, are equally necessary to instruction— either may be conducted effectively or wastefully. By calculating total costs for each program, including administrative costs, we do not suggest that leadership funds are well spent, any more than we believe that a separation of classroom expenditures would identify the most effective teaching techniques. This cannot be determined by finance analyses alone and must be addressed in separate inquiries.

Our approach creates categories that are not comparable to those studies that specifically segregate administrative costs, because we distinguish administrators who are associated with a particular program from those responsible for the overall direction of the school enterprise. We assign the former exclusively to the program with which they are identified; we include the latter in a general administrative "overhead" or indirect category that is ultimately allocated to programs in proportion to each program's "direct" expenditures.

Categorizing expenditures by program creates two unfamiliar results. First, those who specialize in understanding school finance will be unaccustomed to seeing programmatic expenditures. Second, because we include pro-rata shares of state government expenditures (i.e., textbook selection, testing, special schools, teacher certification, and retirement fund contributions), total expenditure figures that we obtain will differ from those in district reports. Because our categories may not easily be comparable to those used in each school district's report, we recognize that our data must be subject to

verification by other researchers. Therefore, we do not offer anonymity to districts in the sample, and EPI will make arrangements for qualified researchers who wish to confirm these calculations.

Findings

Table 1 describes changes in the shares of total spending for each program for the nine districts included in this analysis. The table shows that special education's share increased the most, increasing from less than 4 percent of all spending in 1967 to 17 percent in 1991. In contrast, the share of funds allocated to regular education declined. In 1967, regular education consumed almost all of the available elementary and secondary education dollars—80 percent went to regular classroom teaching, school libraries, textbooks, curriculum development, and teacher training. (This calculation includes a pro-rata, 80 percent share of maintenance and general administrative costs). The share of elementary and secondary spending for regular education fell to 59 percent in 1991. Table 2 describes the distribution of net new money in 1991 in the nine districts. Special education took the largest share (38 percent) of net new money, while regular education received only 26 percent of net new money.

...special education's share increased the most;...in contrast, the share of funds allocated to regular education declined.

Tables 3 and 4 compare changing shares of total spending and amounts of net new money allocated to regular and special education, the two largest spending categories for each district. These tables show that each district in the sample increased its share spent on special education and decreased the share of money spent on regular education.

Regular Education Spending

The decline in the share of total spending for regular education does not mean that real per-pupil spending for regular education decreased. A smaller share of a larger budget can still provide increases. Because total per-pupil spending grew by 73 percent in these nine districts, real regular education per-pupil spending increased despite regular education's reduced relative priority.

Table 5 shows the real per-pupil growth of regular education spending in the nine districts. The range of percentage change in spending between 1967 and 1991 is broad—from a percentage change of 77.9 percent in the Spring Branch school district to a percentage change of 3.5 percent in the Los Angeles school district. The average percentage change was a 28 percent increase in spending per-pupil. Table 6 distinguishes direct from indirect (general administration, operations, and maintenance) expenses in regular education. This table shows that the 3.5 percent decline in the Los Angeles school districts' per-pupil spending on regular education (an average annual decrease of 0.1 percent) partly reflects a much larger decline (an annual average of 2.7 percent) in indirect operations and maintenance expenditures. However, even without this indirect overhead allocation, the direct per-pupil expenditures for regular education in Los Angeles increased only by 9 percent between 1967 and 1991, an average annual rate of only 0.3 percent. This rate is significantly less than the average for the nine districts sampled (where direct per-pupil expenditures for regular education, exclusive of administrative, operations, and maintenance overhead, increased by an annual average of 1.1 percent).

If the changes discussed above are typical of other urban mega-districts, it might help to explain why there is great concern about the academic outcomes of these districts. Other urban districts in the sample, (i.e., Fall River and East Baton Rouge), also saw real direct per-pupil regular education costs

Table 1.—Shares of total per-pupil spending for each program, average of nine districts: 1967 and 1991
(Programs listed in order of 1991 share of total per-pupil spending)

Program	Share of total per-pupil spending 1967	Share of total per-pupil spending 1991	Change in share 1967–91
Regular education	79.6%	58.8%	-20.9
Special education	3.7	17.0	13.3
Compensatory education	5.4	4.3	-1.1
Attendance, counseling, dropout prevention, alternative education	2.1	4.1	2.0
Food services	2.0	4.1	2.1
Regular student transportation	3.9	3.4	-0.5
Vocational education	1.4	3.0	1.6
Bilingual education	0.3	1.8	1.5
Desegregation	0.0	1.6	1.6
Regular health & psychological services	1.3	0.9	-0.3
After-school athletics	0.4	0.7	0.3
Security and violence prevention	0.1	0.4	0.3
All programs	100.0	100.0	
Overhead allocated to above programs:			
General and school administration	9.4	9.7	0.2
Operations and maintenance	15.7	14.3	-1.4

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 5, page 33).

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Table 2.—Shares of net new per-pupil spending, by program: 1967–91 (Programs listed in order of net new per-pupil spending)

Program	Share of net new per-pupil spending, 1991 nine district average
Special education	38.0%
Regular education	25.9
Food services	7.5
Attendance, counseling, dropout prevention, alternative education	7.4
Vocational education	5.2
Desegregation	4.1
Bilingual education	3.9
Compensatory education	2.9
Regular student transportation	2.8
After-school athletics	1.1
Security and violence prevention	0.9
Regular health & psychological services	0.5
All programs	100.0
Overhead allocated to above programs:	
General and school administration	9.8
Operations and maintenance	12.3

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 6, page 34).

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Table 3.—Changes in regular education share of per-pupil spending: 1967–91 (Listed in order of 1991 share for regular education)

District	1967	1991	Regular education share of per-pupil spending change in share 1967–91	Regular education share of net new per-pupil spending: 1967–91
Bettendorf	92%	72%	-20%	36%
Boulder	84	64	-20	9
Anne Arundel	83	62	-21	41
Spring Branch	83	60	-23	44
Middletown	78	59	-19	35
East Baton Rouge	76	57	-18	22
Clairborne	57	53	-4	46
Fall River	76	51	-25	4
Los Angeles	87	51	-36	-5
Average	80	59	-21	26

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 7, page 34).

Table 4.–Changes in special education share of per-pupil spending: 1967–91 (Listed in order of 1991 share for special education)

District	1967	1991	Special education share of per-pupil spending change 1967–91	Special education share of net new per-pupil spending: 1967–91
Fall River	8%	22%	14%	49%
Middletown	2	22	20	46
Los Angeles	2	18	16	42
Anne Arundel	3	18	15	33
Boulder	4	16	12	47
East Baton Rouge	4	16	12	40
Bettendorf	3	16	12	39
Spring Branch	3	13	10	19
Clairborne	4	12	9	26
Average	4	17	13	38

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 8, page 35).

Table 5.—Growth in real regular education per-pupil spending

District	Regular education spending per-pupil (in 1991 dollars) 1967	1991	Total percent change	Average annual percent change
Spring Branch	$1,825	$3,247	77.9	2.4
Anne Arundel	2,513	3,780	50.4	1.7
Clairborne	1,027	1,524	48.4	1.7
Middletown	3,424	4,691	37.0	1.3
Bettendorf	2,674	3,229	20.8	0.8
East Baton Rouge	2,096	2,424	15.7	0.6
Boulder	3,189	3,317	4.0	0.2
Fall River	2,279	2,345	2.9	0.1
Los Angeles	3,118	3,010	-3.5	-0.1
Average change			28.2	1.0

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 9, page 37).

Table 6.–Growth in real regular education per-pupil spending, by type of spending: 1967–91 (Average annual percent change)

District	Direct	Indirect: General administration	Indirect: Operations and maintenance	Total
Spring Branch	2.4%	3.6%	2.1%	2.4%
Anne Arundel	1.7	1.8	1.8	1.7
Clairborne	1.4	4.7	2.4	1.7
Middletown	1.4	0.7	1.2	1.3
Bettendorf	0.9	0.8	0.3	0.8
East Baton Rouge	0.8	0.8	-0.4	0.6
Boulder	0.0	0.2	0.7	0.2
Fall River	0.4	-1.2	-0.5	0.1
Los Angeles	0.3	-0.4	-2.7	-0.1
Average	1.1	1.6	0.8	1.0

SOURCE: *Where's the Money Gone? Changes in the Level and Composition of Education Spending, 1967–1991*, by Richard Rothstein with Karen Hawley Miles. Washington, DC: Economic Policy Institute, 1995. (Table 10, page 38).

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increase by less than the sample average, and this increase was partly a result of drastic reductions in maintenance expenses (and, in Fall River, administrative expenditures as well) attributed to regular education. In contrast, suburban districts such as Spring Branch, Anne Arundel, and Middletown saw direct regular education per-pupil spending increase at an average annual rate of 2.4 percent, 1.7 percent and 1.4 percent, respectively.

The Components of Regular Education Spending and Sources of Change

The 28 percent real growth of regular education spending raises three issues:

- Did regular education spending components change over time?
- How much average teacher salary growth is attributable to higher salary scales, and how much resulted from teachers ascending pay scales by gaining experience and education?
- Have staffing patterns (class size, for example) changed?

To answer these questions Karen Hawley Miles analyzed staffing and enrollment detail for three districts of different sizes: Middletown (small), Boulder (medium-sized), and East Baton Rouge (large). While the regular education costs grew by 28 percent for the nine-districts in the sample, Miles found that in this subsample regular education costs increased 19 percent. The EPI report uses her subsample analysis, in combination with expenditure data from the nine districts, to assess basic patterns, understand variation, and highlight important questions for further investigation.

Our analysis suggests that:

- Dollar allocations between teaching, administration, instructional materials, and other regular education functions changed little between 1967 and 1991. But, this continuity masks important trends.
- In the three districts Miles examined in greater detail, per-pupil spending on compensation for regular education teachers grew by 23 percent.
- Salary scales barely kept pace with inflation: teachers' age (experience) and education almost fully account for the increase in average salaries.
- Spending on instructional aides grew, but still accounts for a relatively small portion of instructional spending.

A uniform programmatic accounting system, if adopted by districts, would help policymakers learn where education money is spent.

Further Research

EPI's study, *Where's the Money Gone*, takes preliminary steps in research areas previously ignored by the education research community. Elaboration and refinement of the "net services index" (NSI), could provide more realistic pictures of education spending changes in other districts and time periods, as well as permit more realistic comparisons of resource growth in different districts and regions. The classification of expenditures by program for other districts and other time periods could help confirm whether the initial conclusions of the EPI report are valid. A uniform programmatic accounting system, if adopted by districts, would help policymakers learn where education money is spent. Development of outcome measures for many school programs is needed before programmatic expenditure data can be used in future discussions of school productivity.

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About the Author

Eric Hanushek is a Professor of Economics and Public Policy and Director of the W. Allen Wallis Institute of Political Economy at the University of Rochester. He joined the University of Rochester in 1978 and has previously been Director of the university's Public Policy Analysis Program and Chairman of the Department of Economics. From 1983–85, he was Deputy Director of the Congressional Budget Office.

Dr. Hanushek's research involves applied public finance and public policy analysis with special emphasis on education issues. He has also investigated the determination of individual incomes and wages, housing policy, social experimentation, statistical methodology, and the economics of discrimination. His publications include *Modern Political Economy, Making Schools Work, Educational Performance of the Poor, Improving Information for Social Policy Decisions, Statistical Methods for Social Scientists,* and *Education and Race,* in addition to numerous articles in professional journals.

Dr. Hanushek was a Distinguished Graduate of the United States Air Force Academy where he received his Bachelor of Science degree in 1965. Between 1965–1974 he served in the U.S. Air Force and in 1968, he completed his Ph.D. in Economics at the Massachusetts Institute of Technology.

Dr. Hanushek had prior academic appointments at the U.S. Air Force Academy (1968–1973) and Yale University (1975–1978). During 1971–72 he was a Senior Staff Economist at the Council of Economic Advisors and during 1973–74, he was a Senior Economist at the Cost of Living Council. From 1988–89 he was president of the Association for Public Policy Analysis and Management.

Improving School Performance While Controlling Costs

Eric A. Hanushek
University of Rochester

The production of school reform reports is a big business in the United States. The current trend of reform was started by *A Nation at Risk*, the 1983 official government report that detailed the decline of America's schools. Since then, new reports have been published so frequently that it is rare for a major institution not to have its own report and position on reform. Yet, it is startling how little any of the reform reports, and the reform movement itself, draw upon economic principles in formulating new plans.

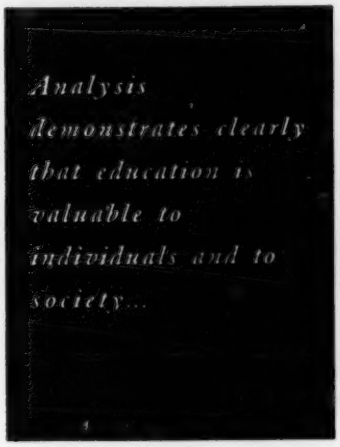
The movement to reform our schools largely is motivated by economic issues. Concerns about the strength of the United States economy, the incomes of the citizens, and the gaps between standards of living for different racial groups are consistently and forcefully grounded in questions about the quality of our schools. A parallel issue, seldom addressed in the reform reports, is whether the steadily increasing funds being devoted to schools are being used effectively. These economic issues are at the core of interest and apprehension about the state of the nation's schools.

An underlying theme of this paper is that economic principles are essential to any true reform of the education system. Economists have studied the role that education plays in developing worker skills since before the United States declared its independence, and have learned a great deal on the subject. More recently, economists have considered how schooling affects such diverse things as the character of international trade and the choices families make about investments in their own health. The results of this work have not been adequately incorporated into the nation's thinking and policies toward schools. Most importantly, standard economic principles are seldom applied to policy making or to the administration of schools.

This paper grew out of the efforts of the Panel on the Economics of Education Reform (PEER), a group of American economists who wanted to bring to light a variety of economic thought and various economic approaches as they relate to school reform. These ideas are elaborated in the panel's report: *Making Schools Work: Improving Performance and Controlling Costs.*[1] This paper, however, does not point to a specific program or method for reorganizing schools to solve the problems associated with school reform, in part because we do not believe that there is a single answer. Instead, the paper advocates an overall concentration on strengthening performance incentives and on comparing benefits with costs—a set of decision rules that have proven extremely useful in enhancing business performance but that have been ignored by schools. The paper also emphasizes the need for experimentation and evaluation—items generally missing from today's schools.

Why We Worry About Education

Because the schooling system allows little room for individual preference or competition among alternative suppliers, it is important that the public have some voice in how it is organized. The central questions include: (1) Are we as a nation investing enough in schooling, and (2) Are resources devoted to schooling being used in the best possible way?



Economists tend to focus on the trade-offs between alternative uses of resources. Money spent on schools cannot be used for buying health services, consumer goods, or national defense (and vice versa). Economists devote very little attention to evaluating choices that individual families make, such as whether to purchase a television or a car, because it is assumed that individuals make informed choices about things that directly affect them. But when government is heavily involved in the decision making, the possibility of under- or over-investing is more likely. If resources are not used effectively, as is more likely when there is little competition, society gives up too many other things in supporting its schools.

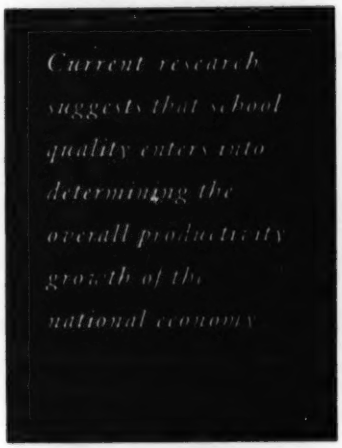
Analysis demonstrates clearly that education is valuable to individuals and to society as a whole. Our economy values skilled individuals, which is reflected directly in the high relative labor market earnings and the low relative unemployment rates of educated individuals. These facts on their own justify general investment in schooling, but they are only part of the story. More educated members of society are generally healthier, they are more likely to become informed citizens who participate in government, they are less likely to be involved in crime, and they are less likely to be dependent on public support. Moreover, the education level of the work force affects the rate of productivity growth in the economy, and thus the future economic well-being of society. These latter factors, while further justifying schooling investments, provide clear reasons for governmental support and finance of education (as opposed to purely private finance).

Much of the analysis on the effects of education on earnings and the economy relate to the amount of schooling obtained by individuals in the population. As previous growth in educational attainment of the population has virtually stopped, the recent debate has turned from how much schooling students receive to questions about the quality of each year of schooling. In simplest terms, are students learning sufficient amounts during each year of schooling, and what is the impact of learning differences among individuals?

[1] The Panel on the Economics of Education Reform (PEER) met over the period 1990–94. Its final report was published by the Brookings Institution in October 1994 (Hanushek et al. 1994).

The strongest evidence of the effects of school quality relate to individual earnings. Better skills of individuals, which can be directly related to the quality of schooling, are rewarded in the labor market. There also is evidence that such skills are becoming more important over time as an increasingly technical work place searches for individuals to fill jobs. Finally, school quality directly affects the amount of schooling an individual completes, with students from better schools seeking post-secondary education, thus, enjoying the added rewards of increased schooling. Again, these benefits justify investments in school quality.

It is also important to understand some of the macroeconomic implications of schooling investments, because the public debate has been particularly confused about these issues. In the past quarter of a century, as questions have been raised about what is happening in schools, the national economy has experienced extraordinary changes. The rate of increase in the productivity of the labor force, an important determinant of the economic well-being of society, fell dramatically in the 1970s and 1980s. The importance of international trade over this period has dramatically impacted the United States economy, leading some citizens and policymakers to panic about our ability to compete as foreign competitors have taken over markets previously dominated by American firms. And, most recently, the economy has languished with low growth of gross domestic product and higher unemployment rates.


Current research suggests that school quality enters into determining the overall productivity growth of the national economy

Which of these issues are related to the perceived decline in the quality of schools during this period, and which are likely to be affected by quality improvements? Current research suggests that school quality enters into determining the overall productivity growth of the national economy, although there is considerable uncertainty about the exact magnitude of the effect. It is, nonetheless, clear that the *past* decreases in productivity could not have been caused by the recent declines in student performance, because these students were not in the labor force in sufficient numbers to have influenced the observed productivity changes (Bishop 1989). Any direct effects of current student quality on national productivity growth will be felt at some time in the future. Moreover, the direct effects of changes in the quality of American schools on the level of trade deficits or on the character of international trade are almost surely very small, since international trade is driven more by other factors of world economies. Finally, there is no reason to believe that business cycles and macroeconomic fluctuations are influenced by the schooling of the labor force. Thus, claims about the effect of schooling, past or future, on overall aggregate performance of the economy appear exaggerated, and these claims do not provide direct justification for significant expansions in public schooling.

In summary, schooling is important. Investing in more and better schooling has been profitable for individuals and society. However, the case for supporting education is not without bounds. Other investments, such as in more modern plants and equipment, also have distinct pay-offs, so that the potential for schooling investments should be kept in perspective. Benefits must be compared to costs. Moreover, even a perfectly functioning school system will not solve all of the problems of our society and economy.

What We Know about Schools

A considerable amount of documentation has been gathered about the economics of the education sector. Education is, after all, a sector that is noticeably larger than, say, steel and automobiles, and, as noted, education has strong links to other parts of the

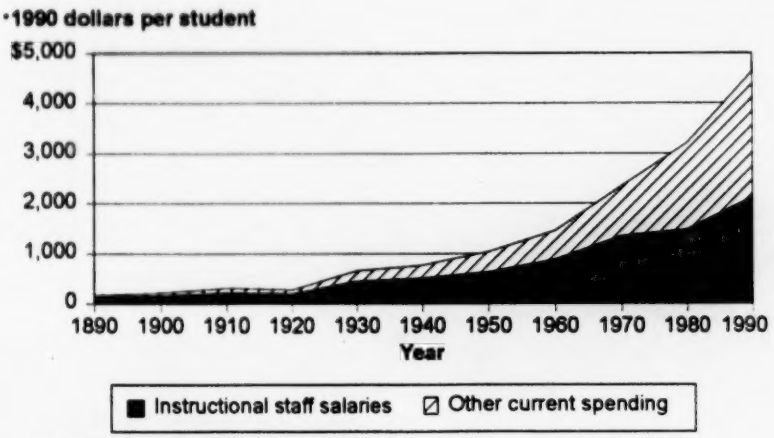
economy. As such, it has received its share of analysis and attention. The results of this economic analysis have been at best ignored, at worst contradicted, in many of the popular versions of school reform.

The overall story about what has been happening in schools is clear: the rapid increases in expenditures on schools during the past three decades simply have not been matched by measurable increases in student performance. Moreover, detailed studies of schools have shown a variety of inefficiencies; inefficiencies which, if corrected, could provide funds for a variety of improvement programs.

There was a dramatic rise in real expenditure per pupil between 1890 and 1990. Figure 1 shows that, after allowing for inflation, expenditures per pupil increased at almost 3.5 percent per year for 100 years (Hanushek, Rivkin, and Jamison 1992; Hanushek and Rivkin 1994). This remarkable growth is not explained away by such things as increases in special education or changes in the number of immigrant students in the school population, although those have had a noticeable impact on school expenditures. Figure 1 also shows that expenditures on instructional staff salaries increased at a noticeably slower rate than expenditures on all other items, particularly between 1970 and 1990.

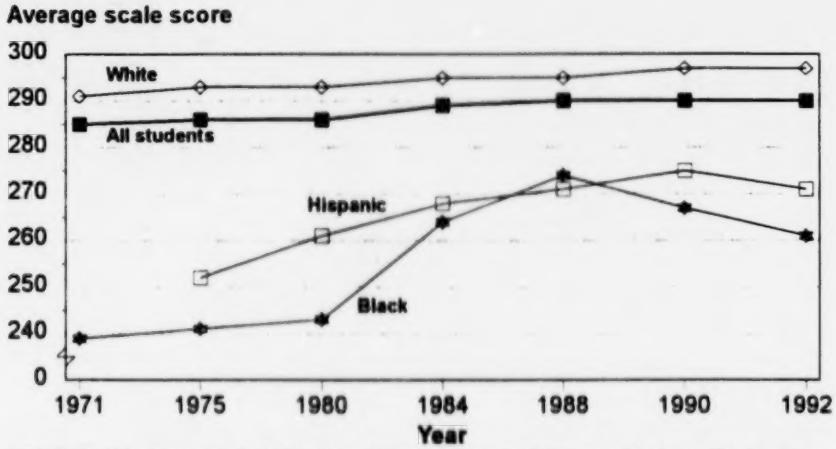
Matched against this growth in spending, student performance has at best stayed constant, and may have fallen. While aggregate performance measures are somewhat imprecise, taken together they indicate no appreciable gains in student performance over time. The path of achievement on reading, mathematics, and science exams, shown in figures 2–4, is representative of the pattern of performance for the population and for racial/ethnic subgroups (Alsalam et al. 1993). These figures show the performance over time of a representative sample of 17-year-olds on the various components of the National Assessment of Educational Progress (NAEP). There also have been a series of embarrassing comparisons with students in other countries. The comparisons of United States and Japanese students in the early 1980s showed, for example, that only five percent of American students surpassed the average Japanese student in mathematics proficiency (McKnight et al. 1987; National Research Council 1989).

Figure 1.–Real expenditure per pupil (in 1990 dollars per student), 1890–1990, by instructional staff salaries and other current spending



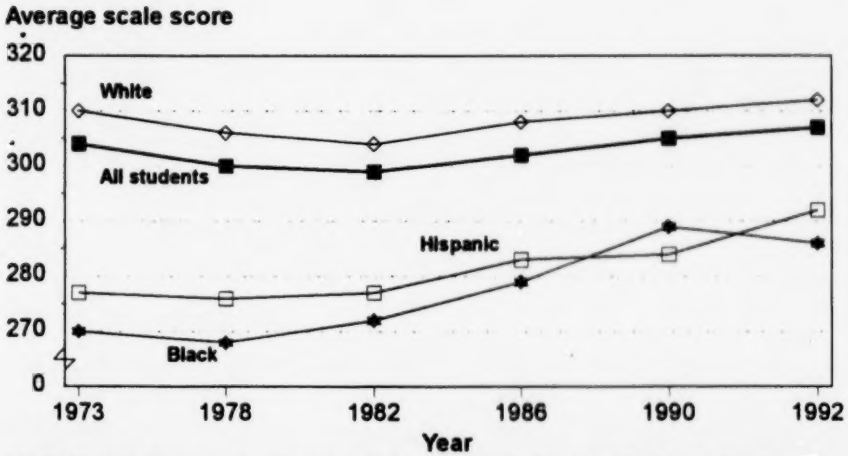
SOURCE: Hanushek and Rivken, 1994.

Figure 2.--Reading achievement of 17-year-olds, by race/ethnicity: 1971–92



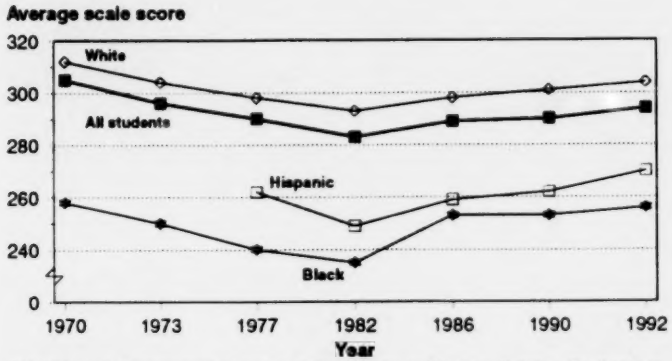
SOURCE: U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1993.*

Figure 3.–Mathematics achievement of 17-year-olds, by race/ethnicity: 1973–92



SOURCE: U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1993.*

Figure 4.–Science achievement of 17-year-olds, by race/ethnicity: 1970–92



SOURCE: U.S. Department of Education, National Center for Education Statistics, *The Condition of Education, 1993.*

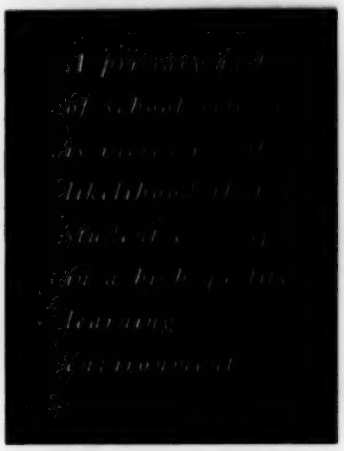
The problems of performance are particularly acute when considered by race or socio-economic status. Even though there has been some narrowing of the differences in performance, the remaining disparities are huge and incompatible with society's goal of equity. The changes in aggregate spending on schools have not been sufficient to eliminate, or even to reduce significantly, the long-standing performance gaps between advantaged and disadvantaged students.

The pattern of spending changes in recent years points to an upcoming fiscal crisis for the nation's schools. During the 1970s and 1980s the American student population fell dramatically. During that time, increases in per-pupil expenditures were offset by decreases in the student population so that aggregate spending on schools rose more slowly than per-pupil expenditures (Hanushek and Rivkin 1994). But the situation is now changing, and the student population is rising again. As rising student populations combine with growth in real spending per student, aggregate spending will increase at a higher rate than it has over the past decade. These prospective expenditure increases are likely to collide with public perceptions that school performance is not rising. If this happens, local taxpayers (who play an important role in American school finance) are likely to resist future expenditure increases with unprecedented insistence, putting schools in a difficult fiscal squeeze. Moreover, many of the major urban districts face fiscal pressures from competing demands for public revenues, such as welfare or police funding, suggesting that the worst of the fiscal crisis might appear in the already pressured schools of major cities.

The aggregate results, where expenditure increases have not been accompanied by improvements in student performance, are confirmed in more detailed studies of schools and classrooms (Hanushek 1986, 1989). These more detailed studies document a variety of common policies that increase costs but offer no assurances of commensurate improvements in student performance. Perhaps the most dramatic finding of analyses of schools is that smaller class sizes usually have no general impact on student performance, even though they have obvious implications for school costs. While some specific instruction may be enhanced by smaller classes, student performance in most classes is unaffected by variations in class size in the standard range of class sizes between 15 and 40 students. Nevertheless, in the face of high costs which yield no apparent performance benefits, the overall policy of states and local districts has been to reduce class sizes in order to try to increase quality. A second, almost equally dramatic example, is that obtaining an advanced degree does little to insure that teachers do a better job in the classroom. It is just as likely that a teacher with a

bachelor's degree would elicit high performance from students as a teacher with a master's degree. Again, since a teacher's salary invariably increases with the completion of a master's degree, this is an example of increased expenditure yielding no gains in performance. These are just two examples of how increased expenditures do not necessarily lead to increased student performance.

At the same time, while there is no consensus about what specific factors affect student performance, there is overwhelming evidence that some teachers and schools are significantly better than others. The dramatic differences in performance simply are not determined by the training of teachers, the number of students in the classroom, or the overall level of spending. A primary task of school reform is increasing the likelihood that a student ends up in a high quality learning environment.



The current inefficiencies of schools, with too much money spent for the student performance obtained, indicate that they can generally make improvements in their performance at no additional cost. Schools need to use existing resources in more effective ways. These inefficiencies also indicate that continuing the general policies of the past is unlikely to lead to student performance gains, even though cost pressures will continue to mount. While it may be appropriate to increase spending on schools in the future, the first priority is restructuring how existing resources are being used.

What Might Be Done

Any reform program must explicitly consider both the costs and the potential benefits of changes. Virtually all past considerations of school reform have simply ignored costs, or argued that the benefits were large enough to support any proposed increased costs. The disregard for costs leads to distorted decisions. Overall, this view undoubtedly lowers the likelihood that any proposals will be taken seriously, because policymakers and the public will consider the price tag attached to any major restructuring of schools. As indicated above, however, attention to both costs and benefits should not be restricted just to new programs. Many existing programs are inefficient, and should be replaced by more cost-efficient programs.

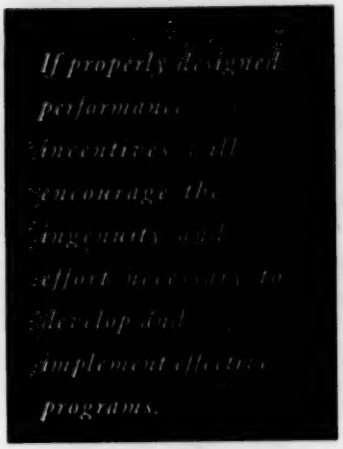
Education is, however, a very complicated task that requires the cooperation and ingenuity of individual teachers, principals, and other school personnel. It is, moreover, virtually hopeless to think of running a high quality educational system without the active involvement of students. Finally, many equally effective approaches to learning various subjects and skills seem to exist, differentiated only by how individual teachers and students adapt to specific tactics and techniques. Because there is no single best approach to performing specific educational tasks, it is simply not possible to design policies that are based on full descriptions of what is to be done and how it is to be done in the classroom.

The policy suggestions here differ from most previous school reform reports. We do not recommend a specific program or restructuring of schools. As the PEER report, *Making Schools Work*, emphasizes, current knowledge simply does not, in our opinion, support specific choices or broad recommendations. Indeed, we have every reason to believe that many different approaches might be simultaneously employed in a revised and effective schooling system. On the other hand, certain strategies in possible reforms are very clearly more beneficial, and it is these that we emphasize. Strategies involving improved incentives, ongoing evaluation, transmission of performance information, and consistent application of rational

decision rules must be central to any productive reform path.

Incentives based on student outcomes hold the largest hope for improving schools. This idea is radically different from past policy, which has been based on a combination of regulations and central prescription of inputs to schooling—the resources, organization, and structure of schools and classrooms. Little attention has been focused on the results. Improvement is more likely to occur if policies are built on what students actually accomplish and if good performance by students is rewarded. If properly designed, performance incentives will encourage the ingenuity and effort necessary to develop and implement effective programs.

The implementation of performance incentives requires having explicit goals and developing measurements of performance that relate to these goals. Improving schools is currently made very difficult by the lack of generally agreed upon measures of performance. Quite clearly, developing incentive systems must include consensus about how good performance is defined and subsequently rewarded. Nonetheless, we do not see a test-driven management of schools but a reform that incorporates a variety of performance observations.


If properly designed performance incentives will encourage the ingenuity and effort necessary to develop and implement effective programs.

A wide range of incentive systems offer hope for improving schools (Hanushek et al. 1994). These systems are the subject of much heated debate and frequently bring forth emotional responses. They include charter schools, merit schools, merit pay for teachers and principals, private contracting for services, magnet schools, and broad-based school choice. Each of these systems conceptually focuses attention and incentives on performance, either through school evaluations or through parental involvement. In addition to these incentives directed at schools, it is important to think of incentives directed at students. Active student participation in schooling is absolutely necessary for high performance, so developing ways to encourage more student (and parent) activity will reinforce any reforms aimed at schools.

These conceptually appealing performance incentives are virtually untested. Few examples of their use are available; and, as with the vast majority of new programs instituted in schools, attempts to introduce these various incentive systems are seldom evaluated in any systematic manner. Therefore, we know neither what forms of incentive systems are best nor what results we might expect from broader use of any specific system.

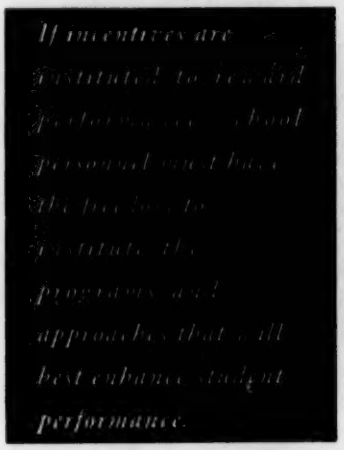
This lack of knowledge about performance systems calls for a broad program of experimentation and evaluation. Improvement on a large scale will be possible only with the development of a knowledge base of effective approaches. However, this is not an argument for more research on schools as they are currently organized. It is specifically directed at encouraging wider development and use of new incentive structures–incentive structures that have little use in the current schools. Such policies are risky, because some incentive systems will not work as hoped or predicted, but the alternative is retaining the old system that we know does not perform acceptably.

Evaluation is central. We must be able to disseminate and build on good results. Evaluation is itself difficult, because it is essential to disentangle the various influences on student performance. Schools and teachers are two factors that affect student learning. The students themselves and their parents directly influence performance, as do other students and other members of the community. Therefore,

evaluation must concentrate on extracting the value-added of schools and linking this value-added to the programs and organization of the schools.

Any improved system will have to harness the energy and imagination of the personnel in the local schools. If incentives are instituted to reward performance, school personnel must have the freedom to institute the programs and approaches that will best enhance student performance. As indicated, the specific approach will almost certainly differ across schools and teachers, even if everybody faces the same reward structure for student performance. All of these approaches support the argument for decentralization of decision making. Some form of site-based management is likely to be an important component of new incentive systems.

The current approach to site-based systems, one of the most popular reform approaches in the country today, is not fully consistent with the ideas presented here. Most existing plans, proposals, and uses of site-based management are not directly linked to student performance. Without such links, decentralization of decision making has little general appeal. In short, site-based management is not an end in itself, but a means for implementing other reforms. Moreover, while the concept of decentralizing decision making is very appealing in various incentive schemes, there is little evidence to suggest that sufficient capacity for such decision making currently exists. As with many of the changes suggested here, the implementation will involve a period of learning and of attracting suitable personnel to carry out the program.



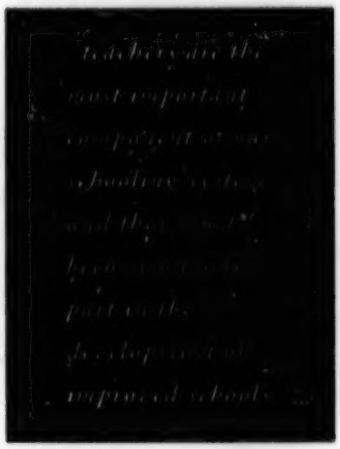
The educational problems of the disadvantaged frequently are treated in an entirely different way from more general reform, but we believe that this is largely inappropriate. The disadvantaged population of this country has undeniably low average performance levels in the schools, and society must follow through on its general commitment to eliminate these disparities. At the same time, the most effective approaches to the education of these students will be based on the same principles espoused here. Careful attention to student outcomes, the development and institution of performance incentives, the evaluation of programs, and attention to both costs and benefits must be central to any plan for improving the education of disadvantaged students. Some of the most promising approaches to the education of the disadvantaged, such as the Accelerated Schools Program, follow the basic principles outlined here, such as having clear objectives and incorporating regular evaluation of student performance into the school structure. Programs for the disadvantaged must, as with other programs, be driven by performance. Programs for disadvantaged students may differ in the details from programs for more advantaged students—for example, through more attention to how families are involved in the programs—but they still rely on better matching between schools and students and personnel. More attention might also be devoted to early childhood education for the disadvantaged, but should be subject to evaluation in the same manner as other school programs. Finally, programs for the disadvantaged may well involve additional resources, but these resources should be linked to developing and instituting effective programs.

How to Implement Change

The current system of American schools does not emphasize student performance, so it should not be surprising that performance does not match our hopes and expectations. Most new programs offer few incentives to improve student achievement, and very little experimentation or evaluation is conducted. Each of these needs to be changed, but change also

implies very different roles for the participants in the system. This discussion highlights key issues involved in re-directing the focus of school policy.

The current teacher or principal would be in a very different situation under virtually any incentive system considered here. In many ways, teachers are the most important component of our schooling system, and they must become an active part in the development of improved schools. The teachers who will be best able to work within a new system with enhanced decision making roles may be quite different from the current teachers in terms of experience, training, expectations, etc. Current teachers cannot, however, be ignored in the process. Even though there will be a significant turnover of teachers over the next decade, the current group of teachers will remain a substantial portion of the total teacher force for many years. Implementation of new systems in which teachers would have different responsibilities and rewards might involve two-tier employment contracts. New teachers would receive very different contracts—contracts that would generally involve less tenure guarantees, more risks, and greater flexibility and rewards. Current teachers, on the other hand, would continue under existing employment rules for tenure, pay, and work conditions unless they individually opt for the new-teacher contract. Such a structure is designed to recognize the legitimate contractual arrangements with current teachers while establishing radically different structures and contracts with new teachers that are consistent with the different incentive structures advocated here.

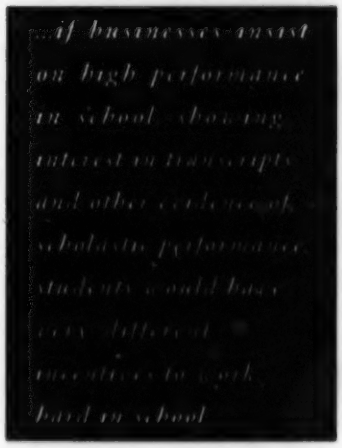


State governments also need to make substantial changes in the role they play in education. The new role of states should be to promote and encourage experimentation and implementation of new incentive systems. The future of school reform depends on developing new information, and states must actively lead in this effort. The states must first work to remove unproductive "input" regulations and certification standards, which unfortunately form the core of most current state educational programs. Instead, states need to concentrate on establishing performance standards and explicit student outcome goals. An important part of this effort is encouraging experimentation with alternative incentive structures and technologies and providing direct support for evaluation and dissemination of program information. Clearly, however, local districts currently do not have sufficient capacity to develop, implement, and evaluate their own systems. Moreover, states often mistrust individual districts and undoubtedly will resist permitting complete flexibility within local districts. To deal with this problem, states should intervene when local systems fail to perform at acceptable levels. The form of intervention is important, however. Perhaps the best response involves the assurance to individual students and parents that alternatives will be provided for non-performing local districts, for example by providing extensive choice or voucher opportunities. The opposite approach, pursued now, is either to develop extensive input and process regulations to reduce the range of potentially unacceptable actions by local districts or to threaten to replace existing district personnel with state personnel. Neither approach provides the right incentives or any real assurance of improvement.

The federal government should take on a primary role in developing outcome goals and standards, developing performance information, supporting broad program evaluation, and disseminating the results of evaluations. The federal government should also be involved in supporting supplemental programs for disadvantaged and minority students. As previously mentioned, programs for disadvantaged students should follow the same guidelines as above, but also

may involve expansion of earlier childhood education, integration of health and nutrition programs, and other interventions to supplement background disadvantages. Providing these added programs is the proper role for the federal government, which strives to insure equal opportunity for all citizens. These federal roles are consistent with many of their current functions, but are extended to complement the performance emphasis proposed for schools.

Local school districts should take responsibility for making curricular choices, managing teacher and administrative personnel including hiring and firing on a performance basis, and establishing closer links with businesses (particularly for students not continuing on to post-secondary schooling). While none of these responsibilities are qualitatively different from current roles, they would be significantly different in content if states removed many of their restrictions on instruction and organization. Moreover, if major decisions devolved to local schools, new emphasis would be placed on management and leadership, and undoubtedly new decision-making capacity would have to be developed.



Businesses also have new roles. While U.S. businesses have frequently lamented the quality of workers they receive from schools, they have never worked closely with schools in defining the skills and abilities that they are looking for in prospective workers. More direct input to schools, perhaps coupled with long-term hiring relationships, could aid both schools and businesses. Moreover, if businesses insist on high performance in school, showing interest in transcripts and other evidence of scholastic performance, students would have very different incentives to work hard in school. Finally, the movement of schools into the realm of performance incentives places them more in line with businesses that have traditionally employed such incentives. Businesses could aid in developing systems of performance incentives for school personnel.

A school system that regularly generated and disseminated performance information would provide a greater role for students and parents. Many of the approaches, such as expanded choice or more decentralized decision making, require an active involvement of parents. Currently, parents do not have many ways to interact effectively with schools, but more emphasis and information about performance could alter this relationship dramatically.

An Overriding Perspective

Most school reform reports begin and end with a plea for additional funding. I have a different view of how reform should proceed. I believe that it is vitally important to concentrate first on incentives and fundamental organizational issues. This focus should precede any substantial changes in funding.

In the long run, the nation may find it appropriate to increase school expenditure. It is difficult to determine at this point what might be appropriate or necessary. But, it is clear that expanding resources first, and looking for reform second, is unlikely to lead to an improved system. A more expensive system, yes. A system with better performance, unlikely.

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